Department of Energy and Resources Management

# mississippi valley conservation report volume II 1970

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Conservation authorities branch
[General publications]
[G - S]

**Department of Energy and Resources Management**

HON. GEORGE A. KERR Q.C., Minister J. C. THATCHER, Deputy Minister

A. S. L. BARNES, Director, Conservation Authorities Branch

# mississippi valley conservation report 1970

**volume II**

**appendix**

ONTARIO

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CONTENTS

# MISSISSIPPI VALLEY CONSERVATION REPORT

## VOLUME II — APPENDIX

### Introduction

This volume is an appendix to Volume I, Conservation Report and Plan. It contains additional maps, tables and sections of text, valuable to Authority members or others responsible for implementing the Plan, but more technical or detailed than required by the broader readership of Volume I. No attempt is made to provide a connected narrative. Volume II is printed in limited quantity for distribution to those concerned.


PHYSIOGRAPHY
LEGEND

## SECTION A4

## LAND RESOURCES

### 3. Natural Vegetation

In general, the original forest cover has been modified by the following:

a. The first logging wave for pine at the beginning of settlement;

b. A second logging era for hardwood during the latter part of the 1800s;

c. Fire;

d. Settlement of the Precambrian Shield region and the area east of this region to the Ottawa River;

e. Re-invasion during the present era of cleared areas where farming has tended to enter a less active state or to cease altogether;

f. Cattle grazing in the area of combined clearings and forests;

g. The maple syrup industry;

h. Exploitation of specific areas for cedar boughs and cedar oil;

i. The cedar post and pole industry;

j. Modern trends favouring reforestation by planning;

k. Modern logging interests;

l. Power line construction;

m. The development of recreation areas; and

n. Limited cover manipulation for wildlife management.

### 4. Use and Management

Current practices that are having an effect on the Authority's land area are:

a. Logging;

b. Current forest land acquisition practices for logging;

c. The cedar post and pole industry;

d. Exploitation for cedar boughs and oils;

e. Reforestation;

f. Power line management;

g. Recreational uses of land, including summer cottages;

h. Limited cover manipulation for wildlife;

i. Grazing of forest lands and marginal clearings;

j. Re-invasion of abandoned clearings;

k. Farming on marginal lands;

l. Fire;

m. Overgrazing of pastures with low carrying capacity;

n. Uneconomic farm units;

o. Habitual use of streambanks by livestock in the eastern portion;

p. Limited application of row-crop farming, hence no significant sheet erosion;

q. Absentee land ownership; and

r. Land acquisition for rural residence.

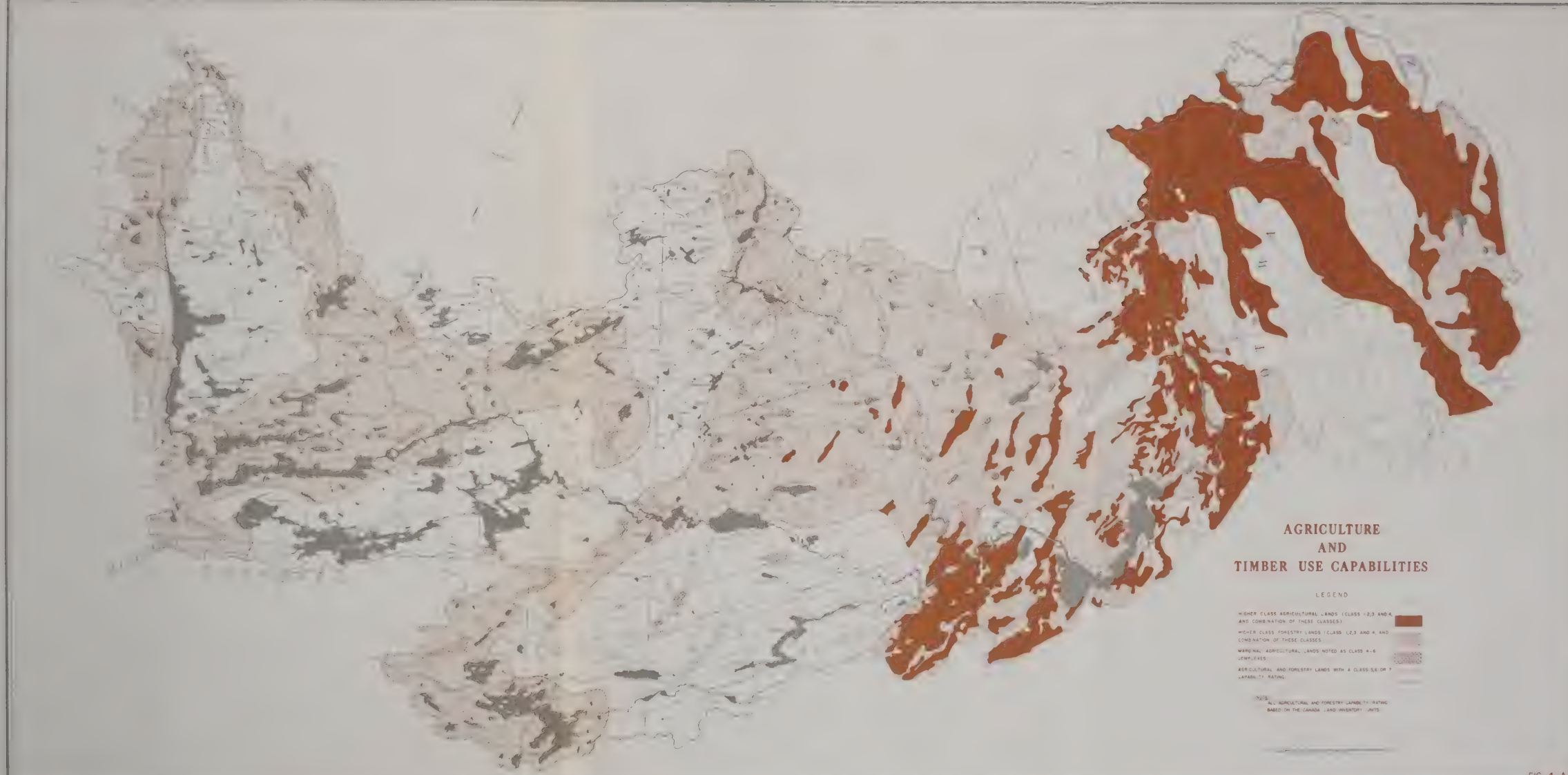

AGRICULTURE
AND
TIMBER USE CAPABILITIES
LEGEND
HIGHER CLASS AGRICULTURAL LANDS (CLASS 1,2,3 AND 4 AND COMBINATION OF THESE CLASSES)
HIGHER CLASS FORESTRY LANDS (CLASS 1,2,3 AND 4, AND COMBINATION OF THESE CLASSES
MARGINAL AGRICULTURAL LANDS NOTED AS CLASS 4-6 COMPLEXES
AGRICULTURAL AND FORESTRY LANDS WITH A CLASS 5,6 OR 7 CAPABILITY RATING.
NOTE
ALL AGRICULTURAL AND FORESTRY CAPABILITY RATING BASED ON THE CANADA LAND INVENTORY UNITS

FIG 4-A1

## GRADIENT TABLE

### MISSISSIPPI RIVER

| FROM POINT | TO POINT | DISTANCE IN MILES | ELEVATION OF POINTS | | DIFFERENCE IN ELEVATION | GRADIENT FEET PER MILE |
|---|---|---|---|---|---|---|
| 1 | 2 | 9.5 | 239 | 324 | 85 | 9.0 |
| 2 | 3 | 2.3 | 324 | 386 | 62 | 26.9 |
| 3 | 4 | 2.9 | 386 | 405 | 19 | 7.3 |
| 4 | 5 | 4.5 | 405 | 424 | 19 | 4.2 |
| 5 | 6 | 2.7 | 424 | 450 | 26 | 9.6 |
| 6 | 7 | 5.9 | 450 | 520 | 70 | 11.9 |
| 7 | 8 | 4.7 | 520 | 645 | 25 | 26.6 |
| 9 | 10 | 2.8 | 645 | 770 | 25 | 44.6 |
| 10 | 11 | 4.2 | 770 | 786 | 8 | 4 |
| 11 | 12 | 7.0 | 788 | 799 | | 6 |
| 12 | 13 | 4 | 799 | 856 | 57 | 13.9 |
| 13 | 14 | 29.2 | 856 | 899 | 43 | 5 |
| OVERALL | | 125.0 | 239 | 899 | 660 | 8.5 |

### FALL RIVER

| | | | | | | |
|---|---|---|---|---|---|---|
| 6 | 24 | 5.6 | 450 | 519 | 69 | 21.1 |
| 25 | 26 | 5.2 | 519 | 561 | 42 | 8 |
| 26 | 27 | 6.8 | 561 | 598 | 37 | 5.4 |
| 27 | 28 | 7 | 598 | 638 | 40 | 33.6 |
| 29 | 30 | 9.2 | 638 | 699 | 6 | 6.6 |
| 30 | 31 | 1.7 | 699 | 804 | 105 | 61.8 |
| OVERALL | | 43.5 | 450 | 804 | 354 | 8.1 |

### INDIAN CREEK

| FROM POINT | TO POINT | STANDS IN MILES | ELEVATION OF POINTS | | DIFFERENCE IN ELEVATION | GRADIENT FEET PER MILE |
|---|---|---|---|---|---|---|
| 15 | 16 | 5.6 | 286 | 474 | 188 | 33.6 |
| 16 | 17 | 9.6 | 474 | 572 | 98 | 10.2 |
| OVERALL | | 15.2 | 286 | 572 | 286 | 18.8 |

### INDIAN RIVER

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 312 | 400 | 88 | 67.7 |
| | | 6.6 | 400 | 525 | 125 | 18.9 |
| | | 4.4 | 525 | 529 | 4 | 0.8 |
| | 22 | 2.3 | 529 | 748 | 219 | 94.9 |
| OVERALL | | 25.3 | 312 | 748 | 486 | 19.4 |

### SWAMP CREEK

| | | | | | | |
|---|---|---|---|---|---|---|
| 38 | 39 | 7.0 | 798 | 878 | 80 | 11.4 |
| 40 | 41 | 0.2 | 878 | 906 | 28 | 140 |
| OVERALL | | 7.4 | 798 | 906 | 108 | 9 |

### BUCKSHOT CREEK

| FROM POINT | TO POINT | STANDS IN MILES | ELEVATION OF POINTS | | DIFFERENCE IN ELEVATION | GRADIENT FEET PER MILE |
|---|---|---|---|---|---|---|
| 32 | 33 | 3.4 | 799 | 850 | 51 | 15.0 |
| 33 | 34 | 7.4 | 850 | 948 | 98 | 13.2 |
| 34 | 35 | 5.4 | 948 | 956 | 8 | 1.5 |
| 35 | 36 | 2.7 | 956 | 1048 | 92 | 34 |
| 36 | 37 | 5.6 | 1048 | 1098 | 50 | 8.9 |
| OVERALL | | 24.5 | 799 | 1098 | 299 | 12.2 |

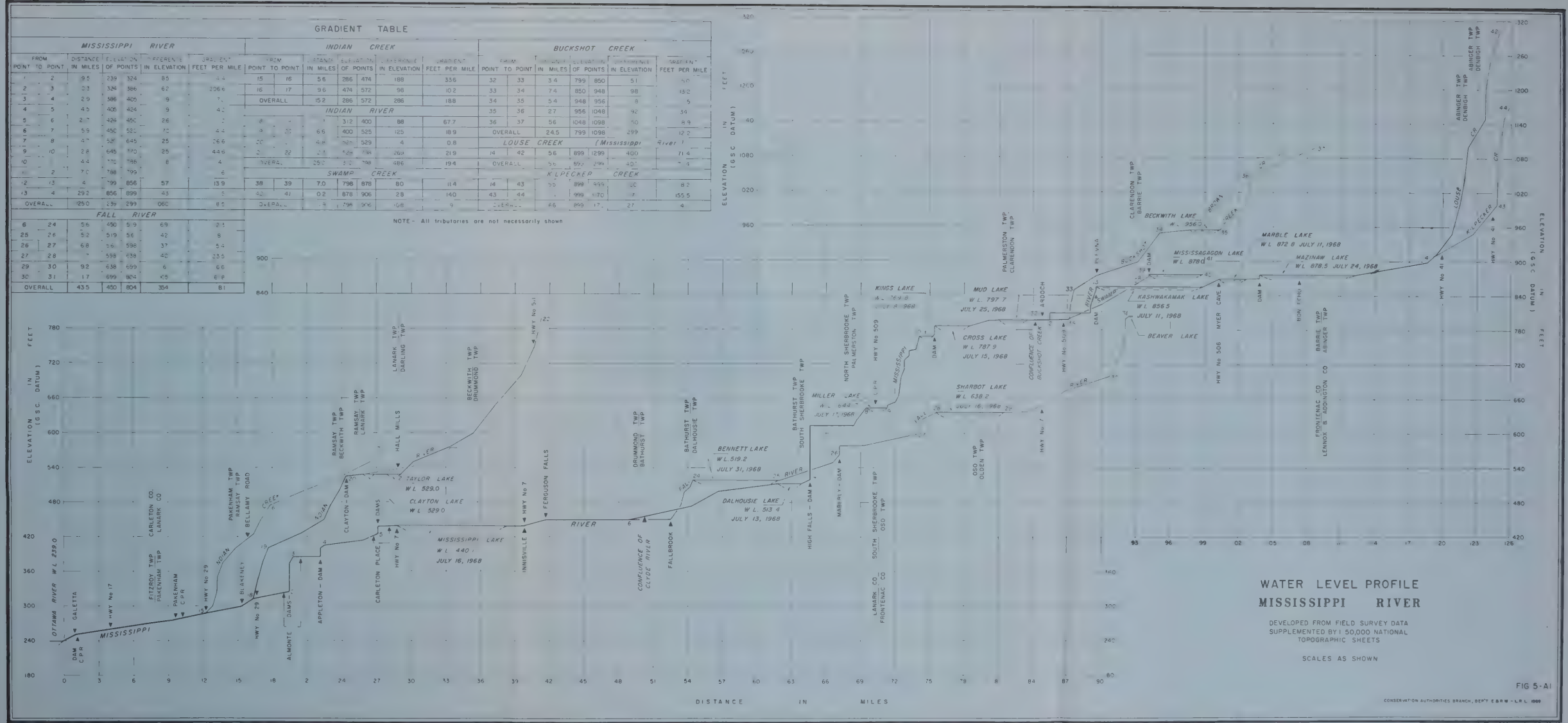
### LOUSE CREEK (Mississippi River)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14 | 42 | 5.6 | 899 | 1299 | 400 | 71.4 |
| OVERALL | | 5.6 | 899 | 1299 | 400 | 71.4 |

### KLPECKER CREEK

| | | | | | | |
|---|---|---|---|---|---|---|
| 14 | 43 | 5.5 | 899 | 999 | 100 | 18.2 |
| 43 | 44 | 1.1 | 999 | 1170 | 171 | 155.5 |
| OVERALL | | 6.6 | 899 | 1170 | 271 | 41.1 |

NOTE - All tributaries are not necessarily shown



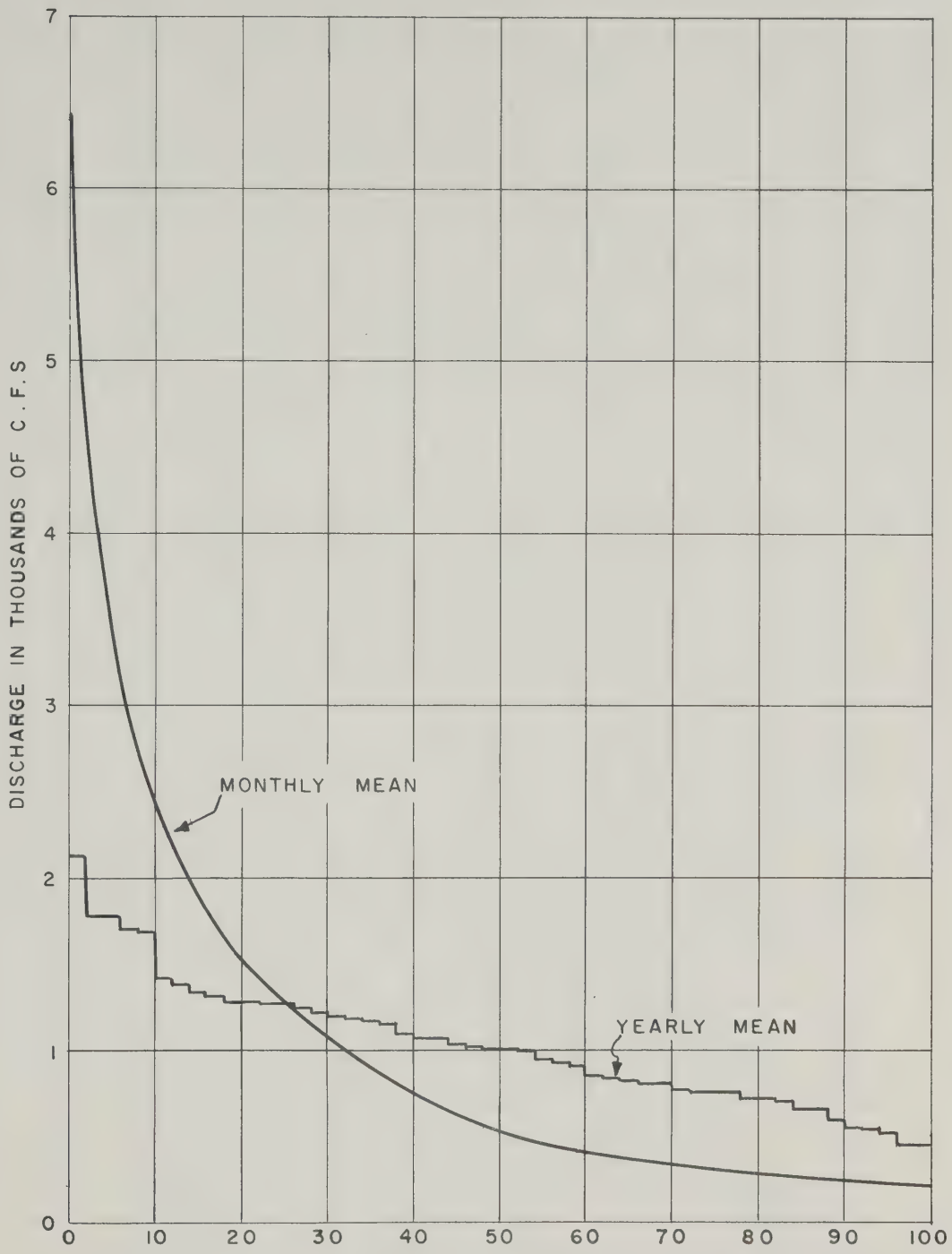

# WATER LEVEL PROFILE
# MISSISSIPPI RIVER

DEVELOPED FROM FIELD SURVEY DATA
SUPPLEMENTED BY 1:50,000 NATIONAL
TOPOGRAPHIC SHEETS

SCALES AS SHOWN

FIG 5-A1

CONSERVATION AUTHORITIES BRANCH, DEPT. E.&R.M. - L.&L. 1969



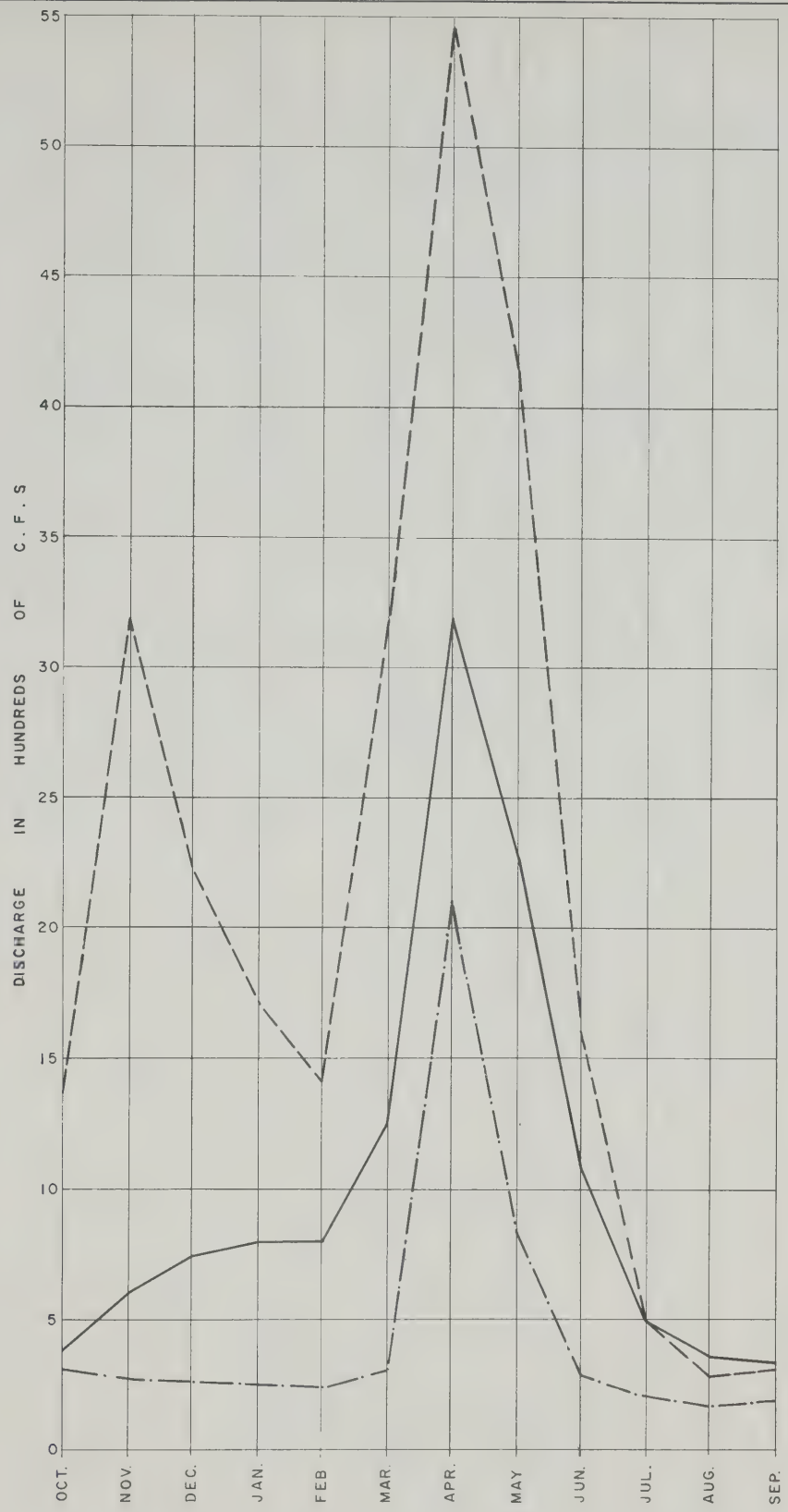

# FLOW DURATION CURVE

## MISSISSIPPI RIVER AT APPLETON

YEARS OF RECORDS – 49

CONSERVATION AUTHORITIES BRANCH Dep't. E R & M. W.C 1969

FIG. 5-A2




# MONTHLY AVERAGE DISCHARGE

## MISSISSIPPI RIVER AT APPLETON

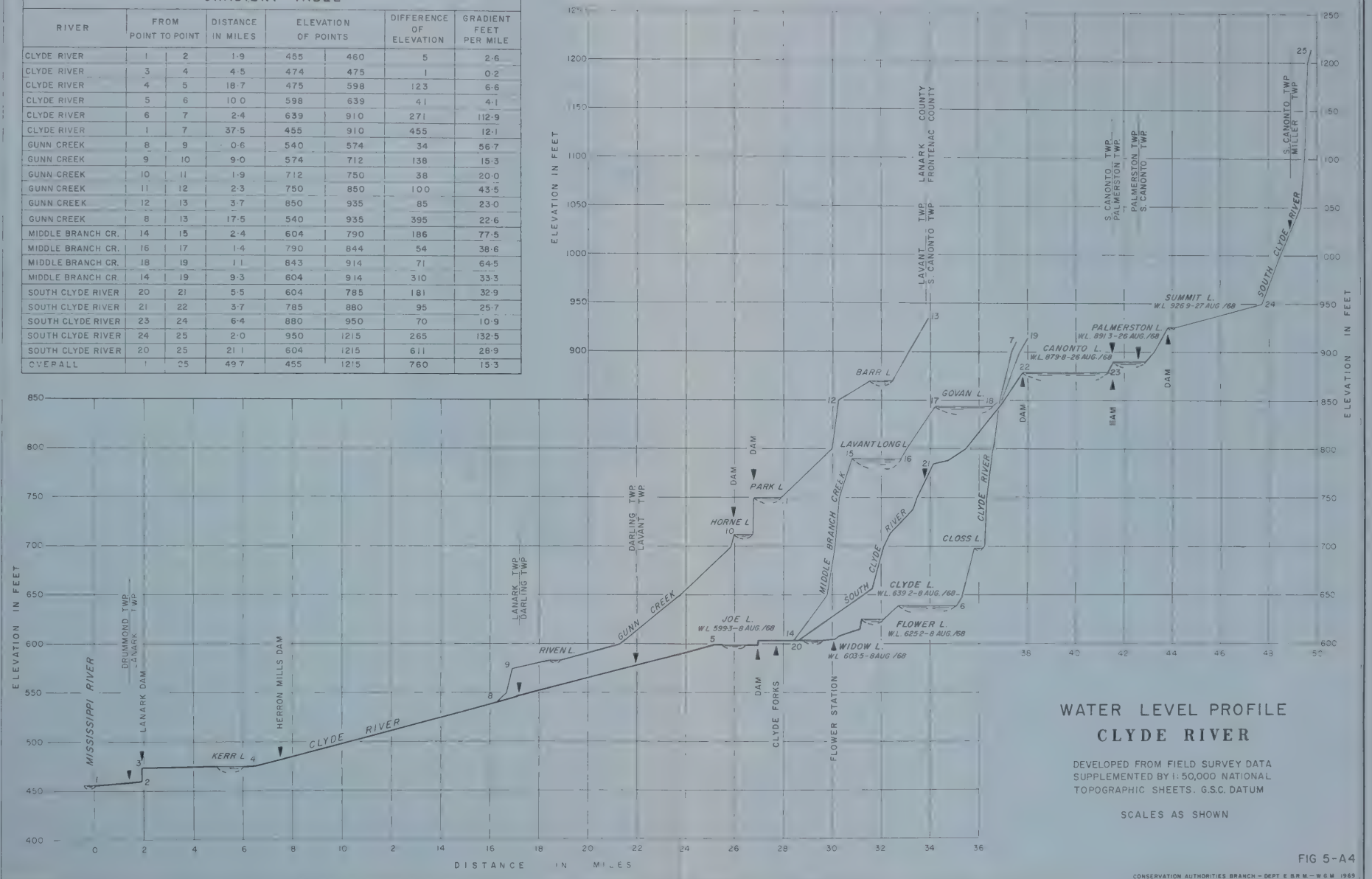
FOR DURATION OF RECORDS — 49 YRS. ——————
WET YEAR — 1928 — 1929 — — — — — —
DRY YEAR — 1961 — 1962 — · — · — · —

FIG. 5-A3

CONSERVATION AUTHORITIES BRANCH Dep't E.R.& M. W C 1969

## GRADIENT TABLE

| RIVER | FROM POINT | TO POINT | DISTANCE IN MILES | ELEVATION OF POINTS | | DIFFERENCE OF ELEVATION | GRADIENT FEET PER MILE |
|---|---|---|---|---|---|---|---|
| CLYDE RIVER | 1 | 2 | 1·9 | 455 | 460 | 5 | 2·6 |
| CLYDE RIVER | 3 | 4 | 4·5 | 474 | 475 | 1 | 0·2 |
| CLYDE RIVER | 4 | 5 | 18·7 | 475 | 598 | 123 | 6·6 |
| CLYDE RIVER | 5 | 6 | 10·0 | 598 | 639 | 41 | 4·1 |
| CLYDE RIVER | 6 | 7 | 2·4 | 639 | 910 | 271 | 112·9 |
| CLYDE RIVER | 1 | 7 | 37·5 | 455 | 910 | 455 | 12·1 |
| GUNN CREEK | 8 | 9 | 0·6 | 540 | 574 | 34 | 56·7 |
| GUNN CREEK | 9 | 10 | 9·0 | 574 | 712 | 138 | 15·3 |
| GUNN CREEK | 10 | 11 | 1·9 | 712 | 750 | 38 | 20·0 |
| GUNN CREEK | 11 | 12 | 2·3 | 750 | 850 | 100 | 43·5 |
| GUNN CREEK | 12 | 13 | 3·7 | 850 | 935 | 85 | 23·0 |
| GUNN CREEK | 8 | 13 | 17·5 | 540 | 935 | 395 | 22·6 |
| MIDDLE BRANCH CR. | 14 | 15 | 2·4 | 604 | 790 | 186 | 77·5 |
| MIDDLE BRANCH CR. | 16 | 17 | 1·4 | 790 | 844 | 54 | 38·6 |
| MIDDLE BRANCH CR. | 18 | 19 | 1·1 | 843 | 914 | 71 | 64·5 |
| MIDDLE BRANCH CR. | 14 | 19 | 9·3 | 604 | 914 | 310 | 33·3 |
| SOUTH CLYDE RIVER | 20 | 21 | 5·5 | 604 | 785 | 181 | 32·9 |
| SOUTH CLYDE RIVER | 21 | 22 | 3·7 | 785 | 880 | 95 | 25·7 |
| SOUTH CLYDE RIVER | 23 | 24 | 6·4 | 880 | 950 | 70 | 10·9 |
| SOUTH CLYDE RIVER | 24 | 25 | 2·0 | 950 | 1215 | 265 | 132·5 |
| SOUTH CLYDE RIVER | 20 | 25 | 21·1 | 604 | 1215 | 611 | 28·9 |
| OVERALL | 1 | 25 | 49·7 | 455 | 1215 | 760 | 15·3 |



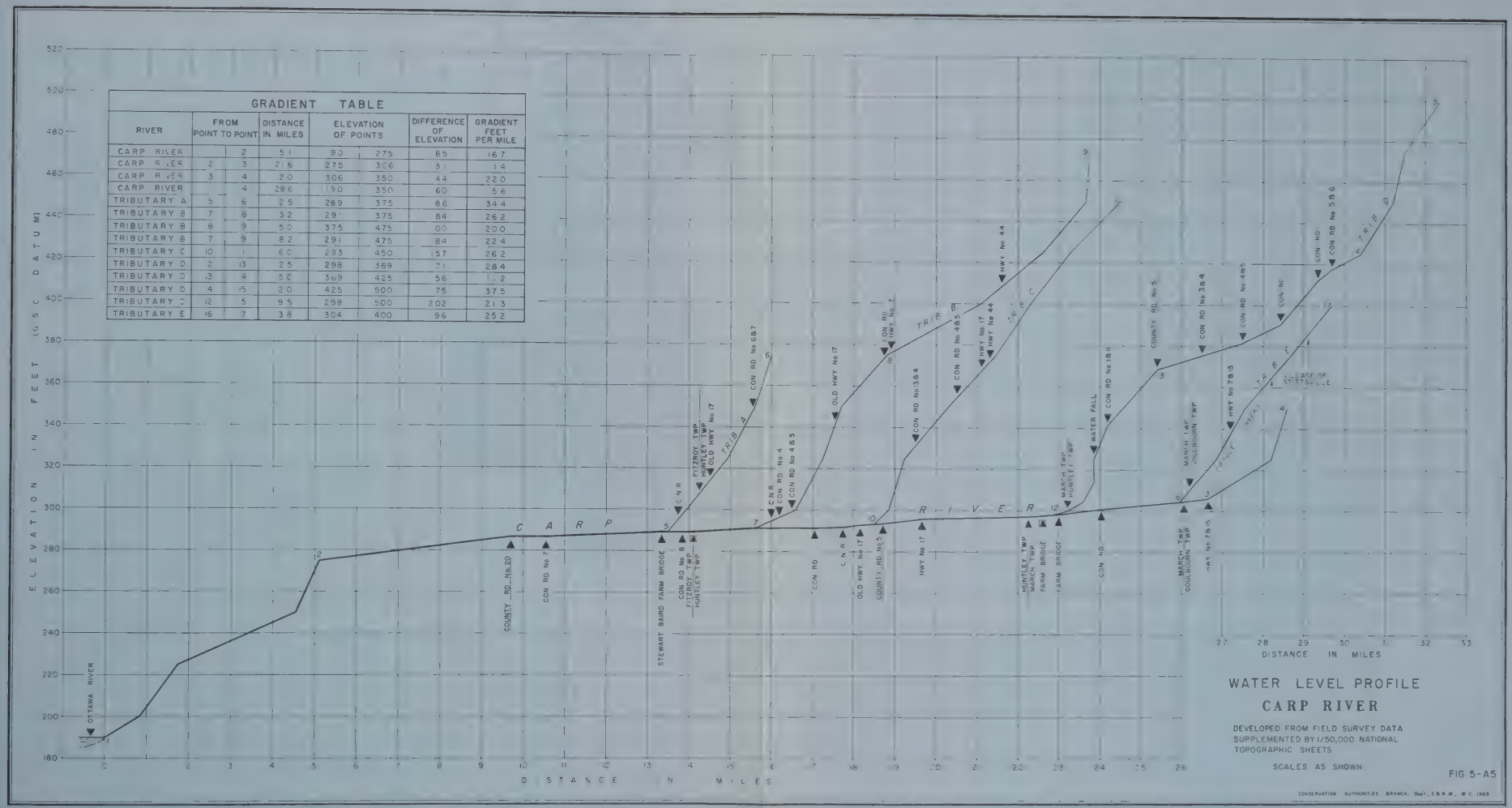

# WATER LEVEL PROFILE
# CLYDE RIVER

DEVELOPED FROM FIELD SURVEY DATA
SUPPLEMENTED BY 1:50,000 NATIONAL
TOPOGRAPHIC SHEETS. G.S.C. DATUM

SCALES AS SHOWN

FIG 5-A4

CONSERVATION AUTHORITIES BRANCH – DEPT. E.B.R.M.—W.G.M. 1969


GRADIENT TABLE
RIVER | FROM POINT | TO POINT | DISTANCE IN MILES | ELEVATION OF POINTS | | DIFFERENCE OF ELEVATION | GRADIENT FEET PER MILE
CARP RIVER | | 2 | 5.1 | 90 | 275 | 185 | 16.7
CARP RIVER | 2 | 3 | 2.16 | 275 | 306 | 31 | 1.4
CARP RIVER | 3 | 4 | 2.0 | 306 | 350 | 44 | 22.0
CARP RIVER | | 4 | 28.6 | 290 | 350 | 60 | 5.6
TRIBUTARY A | 5 | 6 | 2.5 | 289 | 375 | 86 | 34.4
TRIBUTARY B | 7 | 8 | 3.2 | 291 | 375 | 84 | 26.2
TRIBUTARY B | 8 | 9 | 5.0 | 375 | 475 | 00 | 20.0
TRIBUTARY B | 7 | 9 | 8.2 | 291 | 475 | 84 | 22.4
TRIBUTARY C | 10 | 11 | 6.0 | 293 | 450 | 157 | 26.2
TRIBUTARY D | 2 | 13 | 2.5 | 298 | 369 | 71 | 28.4
TRIBUTARY D | 13 | 4 | 5.0 | 369 | 425 | 56 | 11.2
TRIBUTARY D | 4 | 15 | 2.0 | 425 | 500 | 75 | 37.5
TRIBUTARY D | 12 | 5 | 9.5 | 298 | 500 | 202 | 21.3
TRIBUTARY E | 16 | 7 | 3.8 | 304 | 400 | 96 | 25.2
ELEVATION IN FEET (GSC DATUM)
DISTANCE IN MILES
OTTAWA RIVER
COUNTY RD. No. 20
CON RD No 7
STEWART BAIRD FARM BRIDGE
CON RD No 8
FITZROY TWP
HUNTLEY TWP
C N R
FITZROY TWP
HUNTLEY TWP
OLD HWY No 17
TRIB A
CON RD No 687
CON RD No 4
CON RD No 485
C N R
CON RD
OLD HWY No 17
C A R P
R I V E R
CON RD
HWY No 7
TRIB B
CON RD No 384
CON RD No 485
HWY No 17
HWY No 44
TRIB C
HWY No 17
HWY No 44
CON RD
OLD HWY No 17
COUNTY RD. No 5
HWY No 17
HUNTLEY TWP
MARCH TWP
FARM BRIDGE
MARCH TWP
HUNTLEY TWP
FARM BRIDGE
CON RD
WATER FALL
CON RD No 181
COUNTY RD. No 5
MARCH TWP
GOULBOURN TWP
CON RD No 384
CON RD No 485
CON RD
HWY No 7815
TRIB D
CON RD
CON RD No 586
VILLAGE OF STITTSVILLE
WATER LEVEL PROFILE
CARP RIVER
DEVELOPED FROM FIELD SURVEY DATA
SUPPLEMENTED BY 1/50,000 NATIONAL
TOPOGRAPHIC SHEETS
SCALES AS SHOWN
FIG 5-A5
CONSERVATION AUTHORITIES BRANCH, Dept. E.B.R.M., W.C. 1969

## SECTION A6

## FISH AND WILDLIFE RESOURCES

### 1. Fish

#### a. Lake Surveys

FISH KEY

| | | | |
|---|---|---|---|
| 1. | Lake Trout | 9. | Largemouth Bass |
| 2. | Brown Trout | 10. | Smallmouth Bass |
| 3. | Brook Trout | 11. | Whitefish |
| 4. | Rainbow Trout | 12. | Lake Herring (Cisco) |
| 6. | Walleye | 13. | Other Coarse Fish (e.g. Perch, Sunfish) |
| 8. | Northern Pike | | |

OTHER SYMBOLS

C. Depth sounded by Conservation Authorities Branch

L. &F. Depth sounded by Dept. of Lands & Forests

Vegetation — Ch ....Chara
My ....Myriophyllum
Nu ....Nuphar
Pot....Potamogeton*
Sag....Sagittaria
Ty ....Typha
Ut.....Utricularia
Val....Vallisneria
Z .....Zizania

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* For Pot[1] and Pot[2] definition, see page 24

TABLE A6-1

TWEED DISTRICT

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Denbigh Twp. | | | | | | |
| Big Birch | 18 | No | 3 | - | 0 | Fish stocked - 3 |
| Rolufs | 36 | C | 3 | - | 0 | Controlled by beaver dam, max. depth 34' |
| Greggs | 10 | No | 3 | - | 0 | Fish stocked - 3 |
| Mieske | 24 | No | 3 | - | 0 | Fish stocked - 3 |
| Eno | 22 | No | 3 | - | 0 | Fish stocked - 3 |
| Vans | 14 | No | 3 | - | 0 | — |
| Pake | 20 | No | 3 | - | 0 | — |
| Ashby Twp. | | | | | | |
| Rahm | 3 | No | - | - | 0 | — |
| Effingham Twp. | | | | | | |
| Mouse | 12 | No | - | - | 0 | — |
| Garner | 16 | No | 3 | - | 0 | Fish stocked - 3 |
| Feeny | 44 | L. &F. | 3, 11, 13 | Pot, Nu | 0 | Controlled by beaver dam |
| Machesney | 26 | C | 4 | - | 0 | Fish stocked - 4, max. 88' |
| Little Stoll | 28 | No | 4 | Ny | 0 | Fish stocked - 4 |
| Stoll | 108 | C | 13 | Nu,Ny, Sag | 0 | Used by lumber mill, max. 32' |
| Abes | 74 | No | 8, 9, 13 | - | 1 c | Trail to cabin |
| Essens | 44 | No | 8, 10 | - | 0 | — |
| Anglesea Twp. | | | | | | |
| Bon Echo | 168 | C | 8, 9, 10, 13 | - | 0 | Located within Bon Echo Prov. Park, max. 52' |
| Abinger Twp. | | | | | | |
| Irvine | 74 | C | 8, 10 | Z, Ny, Val, Pot,Nu,Sag | 0 | Good duck food in lake, max. 36' |

Table A6-1 continued

TABLE A6-1, TWEED DISTRICT, continued

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Abinger Twp., cont'd. | | | | | | |
| Mackavoy | 58 | L. &F. | - | - | 0 | — |
| Kilbourne | 26 | L. &F. | 3,4 | - | 1 c | — |
| Long Mallory | 146 | No | 1,2 | - | 1 c | Poor road to cabin |
| Winter Road | 28 | No | - | - | 0 | — |
| Little Finch | 46 | C | 10 | - | 0 | Max. 15' |
| Finch | 170 | C | 10 | Nu,Ny | 2 c | Max. depth 29' |
| BeeBee | 14 | No | - | - | 0 | — |
| Browns | 184 | No | - | - | 0 | — |
| Saptrough | 14 | No | - | - | 0 | Poor road |
| Holmes | 18 | No | - | - | 0 | — |
| Wickware | 88 | No | 10 | - | 0 | — |
| Mallory | 72 | C | 10 | Ny,Ut,Z, Val | 0 | Max. 31' |
| Elbow | 96 | No | - | - | 0 | Brown clear water, rocky shore |
| Brooks | 66 | C | 3,4,13 | Nu,Ny, Pot,Ch | 0 | Max. depth - 48', Secchi - 9.5' |
| Mazinaw | 3,724 | L. &F. | 1,5,6, 8,9,10, 11,12 13 | "Sparse" | Many | Max. depth 475' |
| Miller Twp. | | | | | | |
| Buckshot | 1,052 | L. &F. | 1,6,9, 10 | - | 3 r | — |
| Salmond | 32 | No | 3 | - | 0 | — |
| Shaw | 60 | C | - | - | 0 | Max. 45' |
| Gorr | 38 | C | 8,9 | - | 0 | Max. 22' |
| Armstrong | 16 | C | - | - | 0 | Max. 85' |
| Big Lake | 254 | C | 8,9,10 13 | Pot, Ty, Nu, Ny | 2 c | Max. depth 100' |

Table A6-1 continued

TABLE A6-1, TWEED DISTRICT, continued

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Miller Twp., cont'd. | | | | | | |
| Fawn | 68 | No | 6,8,9, 10, 13 | - | 0 | — |
| Grindstone | 400 | L.&F. | 1,4,10, 11,12,13 | Ty, Pot, Nu | 17 c | Water has slight green colour. Detritus is 69% of bottom. |
| Mosque | 362 | L.&F. | 1,3,4 | - | 1 | "Good Trout water" |
| Little Mosque | 30 | L.&F. | 3, 13 | - | 0 | — |
| Obtuse | 22 | No | - | - | 0 | — |
| Barrie Twp. | | | | | | |
| Campbell | 88 | No | - | - | 0 | — |
| Kishkebus | 218 | L.&F. | 1,9,10, 11,12,13 | - | 0 | Access from Plevna Lake |
| Shawenegog | 460 | L.&F. | 3,6,8,9 11,13 | - | 0 | — |
| Shabomeka | 420 | L.&F. | 1,9,10 | Pot, Elodea, Val, Nu, Ny | 0 | Max. depth 105' Secchi - 19.5' |
| Little Shabomeka | 94 | No | 9,10 | - | 0 | — |
| Semicircle | 68 | No | 8,10 | - | 0 | — |
| Horton | 65 | No | 3 | - | 0 | — |
| Norway | 66 | No | 10 | - | 0 | — |
| Rockside | 62 | No | 10 | - | 0 | — |
| Blue | 66 | L.&F. | 3,4,10 | - | 0 | — |
| McCausland | 86 | L.&F. | 1,3,4, 13 | "Sparse" Pot - 1 | 0 | Perch have dwindled despite restocking |

Table A6-1 continued

TABLE A6-1, TWEED DISTRICT, continued

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Barrie Twp., cont'd. | | | | | | |
| Marble | 434 | L.&F. | 1,6,8, 9,10,11, 12, 13 | Pot, Elodea,Nu | 3 r | Max. depth - 66' Secchi - 18.0' |
| Georgia | 38 | No | 6,8,9, 10, 13 | - | 1 r 1 c | — |
| Hill | 6 | No | 8,9,13 | - | 0 | — |
| Mississagagon | 1,254 | L.&F. | 6,8,9, 10,13 | Pot, Ch, Ny, Nu | 0 | Max. depth - 78' Secchi - 18', Marl bottom |
| Kashwakamak | 2,800 | L.&F. | 6,8,9, 10,11, 12,13 | - | 0 | — |
| Star | 20 | C | 8 | Ty | 0 | Max. 10', fallen trees along shore |
| Neal | 28 | C | 8,9,13 | Ny, Ty | 0 | Max. 4' |
| Morgan | 72 | C | 8,9,13 | Scirpus | 0 | Max. 6' |
| Nervine | 2 | No | - | - | - | — |
| Shoepack | 24 | L.&F. | 3,13 | Pot, Algae Ny, Ch | - | Max. depth - 54' Secchi - 18' |
| Clarendon Twp. | | | | | | |
| Clarendon | 5,840 | L.&F. | 6, 8,9 10,11, 12, 13 | - | 9 c | — |
| Plevna | 438 | L.&F. | 6, 8,9 10, 13 | - | 20 r 0 c | Sandy bottom, Walleye not breeding effectively |
| Watson | 60 | No | - | - | - | — |
| Mud | 300 (estimated) | No | - | - | - | Shallow, wildlife crew mapped vegetation |

Table A6-1 continued

TABLE A6-1, TWEED DISTRICT, continued

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Clarendon Twp., cont'd. | | | | | | |
| Ardoch | 203 | C | 6, 8, 9, 10, 13 | Ch | 3 c | Max. depth 49' |
| Turtle | 180 | C | 6, 8, 9, 10, 13 | - | 0 | Max. depth 30' |
| Little Mississagagon | 44 | No | 8, 9, 10, 13 | - | 0 | — |
| Minktrack | 96 | No | 6, 8, 9 10, 13 | - | 0 | — |
| Malcolm | 484 | C | 6, 8, 9, 10, 13 | Ch | 1 r | Max. depth 15' |
| Coxvale | 364 | C | 4, 10, 12, 13 | Pot, Nu, Ny | 1 r<br>15 c | Max. depth 56' |
| Fawn | 384 | L. &F. | 6, 9, 10, 13 | - | 0 | Part of Cross Lake, Gar-pike also present |
| Olden Twp. | | | | | | |
| Conboy | 84 | L. &F. | 6, 8, 13 | Ny, My Nu | 0 | Max. depth 24' Secchi - 10' |
| Smiths | 40 | C | 13 | Nu | 0 | Max. depth 5' |
| White | 625 | L. &F. | 8, 10, 12, 13 | - | 0 | Max. depth 80', Part of fish hatchery |
| Sharbot | 3, 594 | L. &F. | 1, 8, 9, 10, 12, 13 | - | 0 | — |
| Black | 106 | C | 6, 8, 9, 10, 13 | Ch, Nu, Pot | 6 c | Max. depth 65' Part of Prov. Park |
| Bass | 192 | C | 6, 8, 9, 10, 13 | Pot, Nu, Ty | 8 c | Max. depth 38' |
| Little Canoe | 46 | C | 8, 10, 13 | Pot, Nu, Ny | 2 c | Max. depth 32' |

Table A6-1 continued

TABLE A6-1, TWEED DISTRICT, continued

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Olden Twp., cont'd. | | | | | | |
| O'Reilly | 146 | C | 8,9,10 13 | Pot, Nu, Ny, My | 1 r 10 c | Max. depth 52' |
| St. George | 152 | L.&F. | - | - | 0 | — |
| South Canonto Twp. | | | | | | |
| Gowan | 310 | L.&F. | 4,6,8, 13 | - | 0 | Controlled by Beaver Dam |
| Moss | 40 | No | 8 | - | 0 | — |
| Bobs | 22 | L.&F. | 8,10 | - | 0 | — |
| Longstone | 30 | No | 3 | - | 0 | — |
| Cruse | 26 | No | 8 | - | 0 | — |
| Egg | 28 | L.&F. | 3,4,13 | Sag, Nu | 1 c | Max. depth 37' |
| Labine | 16 | No | 3 | - | 0 | — |
| Wolfe | 70 | L.&F. | 3 | - | 0 | Max. depth 20' |
| Summit | 80 | L.&F. | 4 | Pot, Nu | 0 | Secchi - 7.9' |
| Marl | 42 | C | 10, 13 | - | 0 | Max. depth 8' Very shallow |
| Canonto | 574 | L.&F. | 1,3,4, 8,9,10, 12,13 | Ty, Ny, Nu, Ch | 7 c | Secchi - 20.5' |
| North Canonto Twp. | | | | | | |
| Straddlebug | 22 | No | 3 | - | 0 | — |
| Palmerston Twp. | | | | | | |
| Palmerston | 1,264 | L.&F. | 1,3,4, 10, 12, 13 | - | 2 r | — |
| Turcott | 4 | C | - | Ch | 0 | Max. depth 3' Shallow |
| Sunday | 158 | L.&F. | 6,8,9, 10, 13 | Pot | 3 c | Max. depth 48' Secchi - 17' |
| Twenty-Six | 60 | C | 8,9, 10, 13 | - | 0 | Max. depth 6' |

Table A6-1 continued

TABLE A6-1, TWEED DISTRICT, continued

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Palmerston Twp., cont'd. | | | | | | |
| Antoine | 192 | L.&F. | 8,9,10, 13 | - | 1 c | — |
| Cross | 4,070 | L.&F. | 1,6,8, 9,10,13 | - | 4 r<br>1 c | — |
| Kings | 180 | C | 6,8,9, 10, 13 | Nu, Ny, Sag | 1 r<br>5 c | Max. depth 32' Good for Walleye, several deep holes |
| Miller | 176 | C | 1,6,8, 9,10,13 | - | 8 c | Max. depth 59' |
| Elphin | 68 | No | - | Ny, Nu, Sag | 0 | Checked for waterfowl |
| Cranberry | 50 | C | 6,10 | Nu, Ny | 0 | Max. depth 4' Shallow, silt bottom |
| Oso Twp. | | | | | | |
| Silver | 672 | L.&F. | 1,4,8, 9,10, 12,13 | - | 20 c | — |
| Blithfield Twp. | | | | | | |
| Closs | 40 | No | 8 | - | 0 | — |
| Bailey | 20 | No | 3 | - | 0 | — |
| Charlie | 10 | No | 3 | - | 0 | — |
| Squaw | 16 | No | 3 | - | 0 | — |
| Clyde | 250 | L.&F. | 8,9,13 | 'Moderate' | 1 r<br>20 c | Max. depth 40' |
| Bartraw | 39 | C | 8 | - | 0 | Max. depth 40' |
| Croft | 8 | No | 13 | - | 0 | — |

TABLE A6-2

KEMPTVILLE DISTRICT

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Lavant Twp. | | | | | | |
| Flower | 240 | L. &F. | 6,8,10, 9, 13 | Nu, Ny | 1 r 15 c | — |
| Mann | 28 | - | 13 | - | 0 | — |
| Lavant Long | 198 | L. &F. | 1,9,13 | - | 2 c | Max. depth 36' Secchi - 12' |
| Perch | - | L. &F. | - | - | 0 | — |
| Widow | 55 | L. &F. | 6,8,13 | - | 0 | — |
| Little Joe | 21 | - | 8,10 | - | 0 | — |
| Joe | 148 | L. &F. | 6,8,10, 13 | Z, Ny, My, Val, Pot 2 | 5 c | Good duck area at head of lake |
| Clyde | 250 | L. &F. | 8,9,13 | - | 24 c | — |
| Dobbie | 22 | - | - | - | 0 | — |
| LaFrance | 94 | C | 6,8,9, 10, 13 | Ty, Nu, Ny, Pot 2 | 3 c | Max. depth 52' Fishing excellent |
| Poverty | 9 | - | 8 | - | 1 hunt camp | — |
| Lavant | 85 | C | - | - | 1 c | — |
| Pigeon | 30 | - | 13 | - | 0 | — |
| Nelson | 12 | - | 8,13 | - | 0 | Marshy lake |
| Umpherston | 21 | - | 8,10 | - | 0 | Beaver-dam-controlled |
| Gallagher | 15 | - | 8 | Thick veg. | 0 | Shallow, mud bottom |
| Nicholson | 9 | - | - | - | 0 | — |
| Graham | 49 | L. &F. | 6,8,13 | Nu, Ny | 1 c | |
| Connors | 29 | - | 13 | - | 0 | — |
| Robertson | 158 | L. &F. | 1,6,8, 10,13 | - | 1 r 12 c | — |

Table A6-2, continued

TABLE A6-2, KEMPTVILLE DISTRICT, Continued

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Lavant Twp., Cont'd. | | | | | | |
| Willyhart | 8 | - | 8 | - | 0 | — |
| Bingley | 10 | - | 8 | - | 0 | — |
| Dixon | 24 | L. &F. | 3,10,13 & Pearl Dace | - | 0 | Max. depth 20' Spring fed |
| Caldwell | 42 | L. &F. | 8, 13 & Blunt nose minnow | - | 1 c | Max. depth 65' |
| Bottle | 21 | L. &F. | 3, 13 | - | 0 | Max. depth 80' |
| South Sherbrooke Twp. | | | | | | |
| Silver | 608 | L. &F. | 1,4, 8, 10,12,13 | - | 0 | — |
| Fagan | 168 | L. &F. | 6,10 | Pot, Nu, Ny | 0 | Max. depth 24' Secchi - 14' |
| McGowan | 102 | C | 8,9,10 | - | 0 | Max. depth 12' |
| Dalhousie Twp. | | | | | | |
| Barr | 62 | - | - | - | 0 | — |
| Matthie | 28 | - | 8 | - | 0 | — |
| Bower | 49 | L. &F. | 8, 13 | - | 0 | Max. depth 25' Secchi - 15' |
| Wood | 45 | - | - | - | 0 | — |
| Park | 138 | L. &F. | 6,8,13 | Nu, Ny | 1 r 4 c | Max. depth 45' Secchi - 12' Controlled by private dam |
| Horne | 81 | L. &F. | 6, 8 | Nu, Ny | 0 | Controlled by mill dam |
| Tate | 7 | L. &F. | 8 | - | 0 | Max. depth 17' |
| Paddy | 9 | - | 8 | - | 0 | — |
| Patterson | 350 | L. &F. | 6,8,10 13 | Nu, Ny | 1 r 15 c | Max. depth 53' |

Table A6-2, continued

TABLE A6-2, KEMPTVILLE DISTRICT, Continued

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Dalhousie Twp., Cont'd. | | | | | | |
| Dalhousie | 1,460 | L. &F. | 6,8,9, 10,12,13 | - | 2 r many c | Max. depth 36' |
| Barbers | 99 | L. &F. | 6,8,13 | 'Sparse' | 0 | Beaver-dam-controlled, possible Brook Trout area |
| Big Mud | 120 | - | 8 | - | 0 | Part of Mississippi River. Good waterfowl area |
| Boyd | 22 | - | - | - | 0 | — |
| Anderson | 14 | L. &F. | - | - | 1 c | — |
| Bathurst Twp. | | | | | | |
| Bennett | 1,268 | L. &F. | 6,8,9, 10, 13 | Ty, Z, Val, Pot | 100 c (Approx.) | Secchi - 14, recommended planting of Walleye by L. &F. |
| Upper Mud | 23 | - | - | - | 0 | Good duck area |
| Lower Mud | 23 | - | - | - | 0 | Good duck area |
| Darling Twp. | | | | | | |
| Peterwhite | 28 | C | 3,13 | Pot,Nu,Ny | 1 c | Max. depth 21' |
| Willis | 7 | - | - | - | 0 | — |
| Kates | 14 | L. &F. | 3,6,13 | Ch,Nu,Pot | 0 | Max. depth 30' Secchi - 5.5' |
| Dunks | 8 | L. &F. | 6 | - | 0 | — |
| Murray | 49 | L. &F. | 1,3,4, 13 | Ty,Nu,Ny | 2 c | Max. depth 90' Secchi - 20' |
| McIlraith | 6 | - | - | - | 0 | Shallow |
| Bow | 52 | L. &F. | 8 | - | 6 c | Max. depth 6' |
| Roberts | 30 | C | 8,13 | Ch, Ny | 13 c | Max. depth 50' Recommend L. Trout stocking |

Table A6-2, continued

TABLE A6-2, KEMPTVILLE DISTRICT, Continued

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Darling Twp., Continued | | | | | | |
| Madden | 90 | - | - | - | 0 | — |
| Schuyler | 14 | L.&F. | 3 | - | 0 | — |
| Skunk | 4 | - | 13 | - | 0 | — |
| Cranberry | 51 | - | 10 | - | 0 | — |
| Brandy | 4 | - | - | - | 0 | — |
| Lanark Twp. | | | | | | |
| Riven | 70 | L.&F. | 6,8,10, 13 | Val, Pot, Nu, Ny, Z | 2 c | Max. depth 20' Secchi - 10' |
| Horn | 86 | C | 8 | Nu, Ny, Z, Pot, Ty | 1 c | Max. depth 41' |
| Little | 12 | - | - | - | 0 | — |
| Kerr | 134 | L.&F. | 6,8,10 | Pot, Val, Ny | 4 c | Max. depth 18' Secchi - 10' Dam controlled by Town of Lanark |
| Gillies | 63 | C | 6,8,13 | Ch, Ty, Nu | 6 c | Max. depth 20' |
| Baxter | 30 | C | 8,13 | Ch, Ty, Ny, Ut, abundant along sections of shore | 0 | Max. depth 29' |
| Hardy | 45 | - | - | - | 0 | Mud bottom, shallow, some duck potential |
| Mud | 29 | - | 13 | - | 1 c | House on lakeshore |
| Steward | 49 | - | - | - | 0 | — |
| Aitkman | 8 | L.&F. | 8 | - | 1 c | — |
| Craig | 22 | - | 8 | Ch, Ny, Ty | 0 | Max. depth 15' Shallow mud bottom |
| Samuel | 35 | - | 8 | Ch, Pot[2], Pot[1], Nu, Ny along shore | 0 | Max. depth 34' |

Table A6-2, continued

TABLE A6-2, KEMPTVILLE DISTRICT, Continued

| Lake | Area in Acres | Depth Sounded By | Fish Species | Vegetation | Cottages & Resorts | Remarks |
|---|---|---|---|---|---|---|
| Lanark Twp., Continued | | | | | | |
| MacKay | 49 | L. &F. | 8, 13 | - | 0 | Max. depth 100' Beaver controlled |
| Reid | 31 | C | 13 | Very Common | 0 | Max. depth 9' |
| Mort | 4 | - | - | - | 0 | — |
| Clayton | 1,117 | L. &F. | 8, 9, 10, 13 | 'Sparse' | 2 r 12 c | Max. depth 40' 'Stumps' |
| Taylor | 700 | C | 8, 9, 13 | Nu, Ny, Pot, Ty | 1 c | Max. depth 9' 'Stumps', dam being built to raise water level |
| Quigg | 50 | No | 8 | - | 0 | Mostly marsh, good for ducks |
| Marshall | 8 | No | - | - | 0 | Shallow, weedy |
| Drummond Twp. | | | | | | |
| Haley | 350 | L. &F. | - | - | 1 c | Max. depth 3', very shallow, Leased by hunt club |
| Mississippi | 5,800 | L. &F. | 6, 8, 9, 10, 13 | - | r 1800 c | Max. depth 31', excellent waterfowl area |
| Pakenham Twp. | | | | | | |
| Coyle | 10 | No | - | - | 0 | — |
| Ramsay Twp. | | | | | | |
| Bowley | 5 | No | - | - | 0 | Possible duck habitat |
| March Twp. | | | | | | |
| Constance | 358 | C | 8, 13 (perch) | - | 0 | Used by sea-planes |

## LAKES FOR WHICH CONTOUR MAPS ARE INCLUDED IN THIS REPORT

### ABINGER TOWNSHIP

1. Little Finch Lake: Aquatic vegetation in this lake is confined to the south-east and south-west bays, where there are scattered Pondweeds. The lake is reported by local fishermen to contain only smallmouth bass and minnows. It is easily accessible from a road near the farm buildings on the west shore. The lake has a sandy bottom. There is one summer cottage in the south-west bay.

2. Irvine Lake has an excellent variety of aquatic vegetation in the shallows on the east and west sides. The vegetation includes abundant Wild Celery (vallisneria).

3. Finch Lake: Smallmouth bass were caught in this lake during the survey. There were three cottages on the south side. Aquatic vegetation is limited to Water-lilies at the extreme east and west ends.

4. Mallory Lake: More than 90 per cent of the shore of this lake is rock. The aquatic vegetation appears to be relatively unimportant but does include coarse Pondweeds and a small quantity of Wild Rice. Eel grass appears in vegetation in the river north-east of the lake. There is a large area of bog covered with Labrador Tea and other heaths north of the lake.

### CLARENDON TOWNSHIP

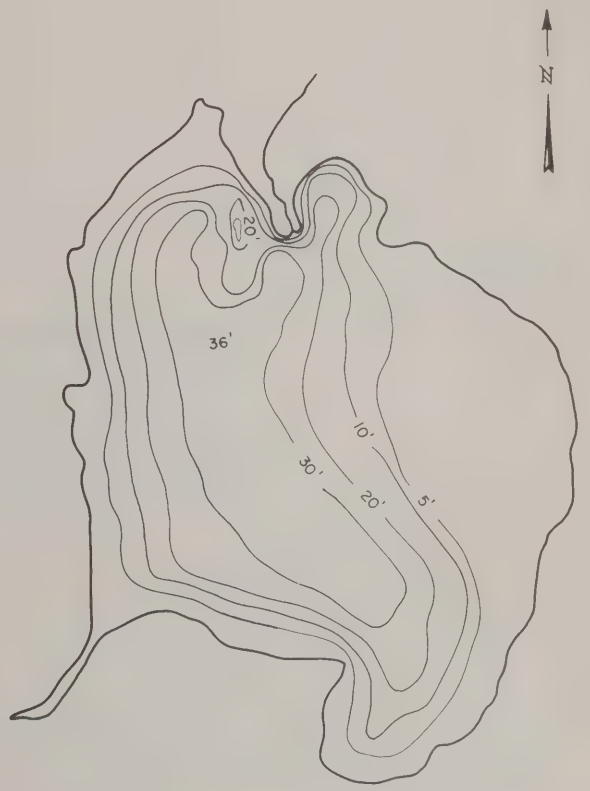
1. Malcolm Lake: There are populations of walleye, northern pike and smallmouth bass in this lake. There is relatively heavy fishing pressure. Eight boats with fishermen were on the lake on July 3, 1968. There were 15 cottages on the lake on the above date. There is also a farm with a trailer camp on the shore. There is also a campsite on the shore near the access road. There is very little aquatic vegetation.

2. Coxvale Lake: There are 15 cottages and one tourist resort on this lake. Aquatic vegetation is very scanty, consisting of scattered sparse areas of yellow and white Water-lilies.

3. Ardoch Lake: Only three cottages were found on this lake in 1968. The vegetation appears to be confined to the west end where Chara is abundant. The fish of the lake include largemouth bass, northern pike, walleye, bluegill, rock bass and burbot.

### DARLING TOWNSHIP

Peterwhite Lake, which has one cottage on it, appears to be of relatively little significance. No fish were caught, but since a loon's nest was found on the edge of the lake, at least there must be forage fish in the lake. Brook trout were introduced in 1968.



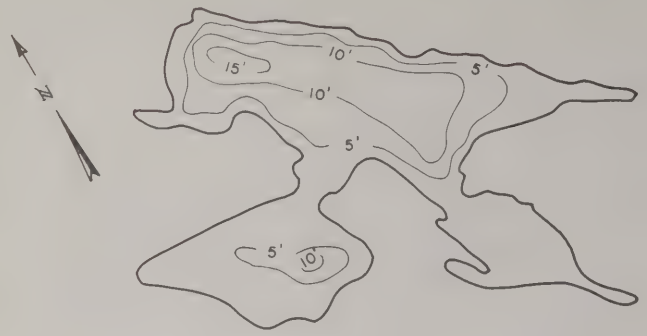

# IRVINE LAKE

(ABINGER TWP.)

DEPTH CONTOURS

SCALE 250 125 0 250 500 750 FEET

SURVEYED: JULY 31, 1968.




# LITTLE FINCH LAKE

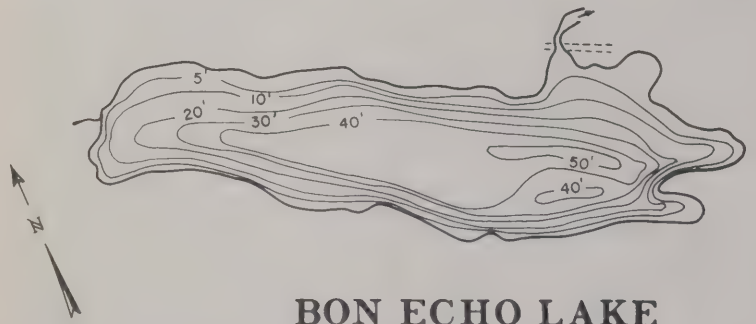
(ABINGER TWP.)

DEPTH CONTOURS

SCALE 250 125 0 250 500 750 FEET

SURVEYED: AUGUST 23, 1968

(THESE MAPS ARE NOT NAVIGATIONAL CHARTS)




# BON ECHO LAKE

(ANGLESEA TWP.)

DEPTH CONTOURS

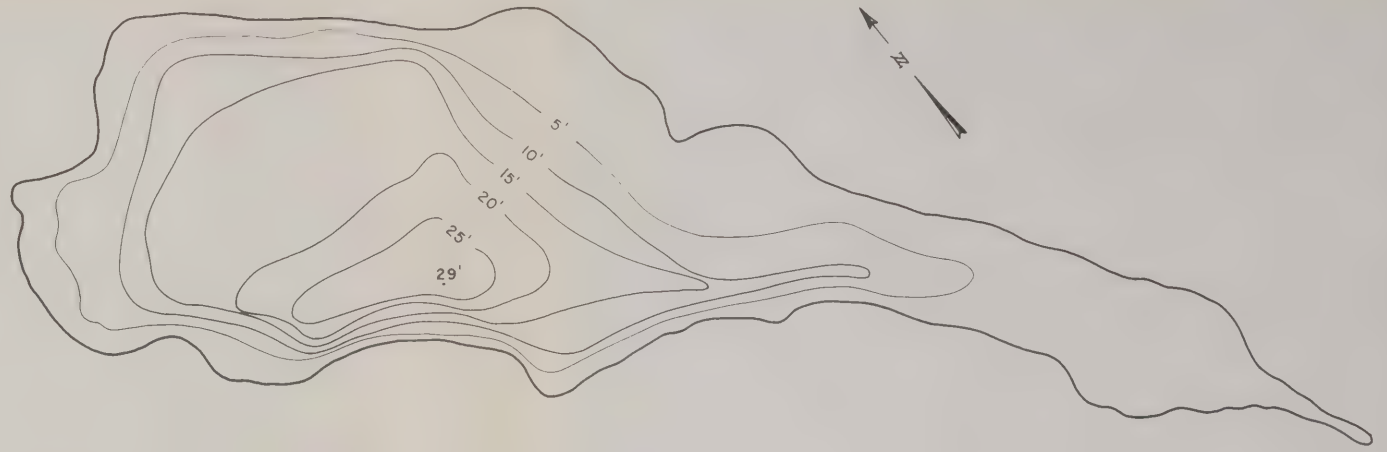
SCALE 660 330 0 660 1320 1980 FEET

SURVEYED: JULY 16, 1968.

FIG. 6-A1



CONSERVATION AUTHORITIES BRANCH, DEP'T. E.B.R.M., P.D.T. 1968




# FINCH LAKE

(ABINGER TWP.)

DEPTH CONTOURS

SCALE 250 125 0 250 500 750 FEET

SURVEYED: AUGUST 23, 1968.

(THESE MAPS ARE NOT NAVIGATIONAL CHARTS)


# BROOKS LAKE

(ABINGER TWP.)

DEPTH CONTOURS

SCALE 330 165 0 330 660 990 FEET

SURVEYED: JUNE 16, 1968.


# MALLORY LAKE

(ABINGER TWP.)

DEPTH CONTOURS

SCALE 500 250 0 500 1000 1500 FEET

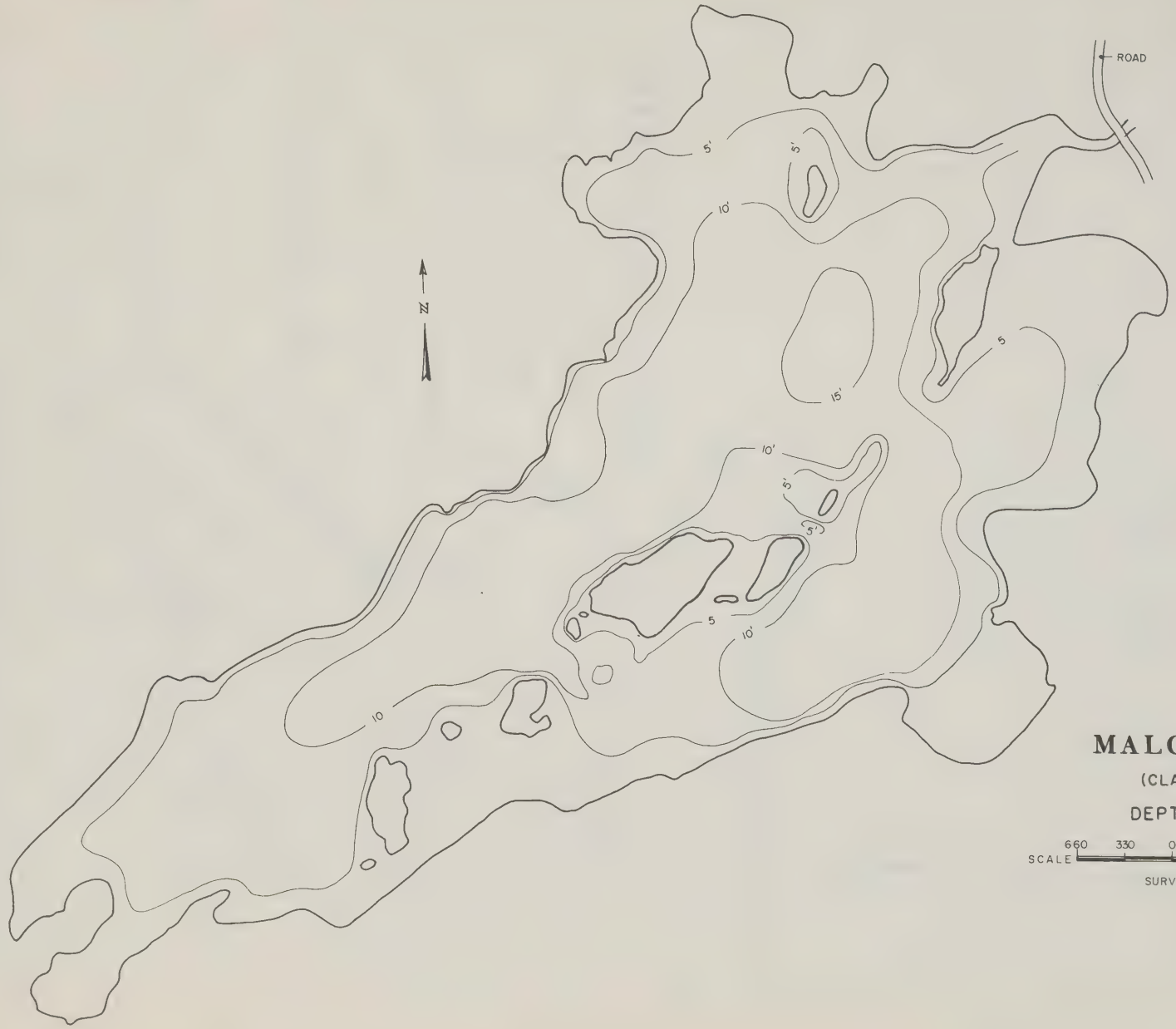
SURVEYED: AUGUST 13, 1968.

FIG. 6-A2

MISSISSIPPI VALLEY

CONSERVATION AUTHORITIES BRANCH, DEP'T. E.&R.M., P.D.T. 1968

(NOT TO BE USED AS A NAVIGATIONAL CHART)




# MALCOLM LAKE

(CLARENDON TWP.)

DEPTH CONTOURS

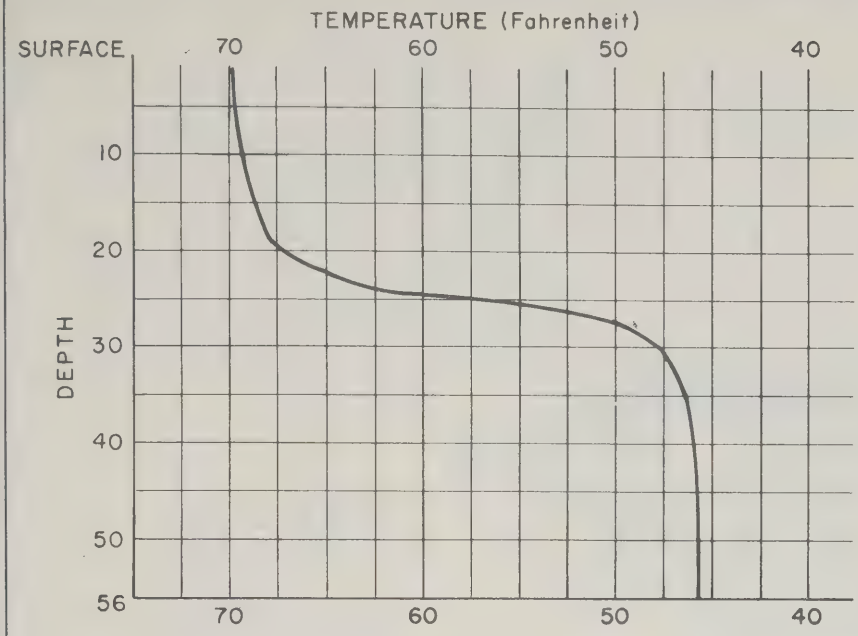
SCALE 660 330 0 660 1320 FEET

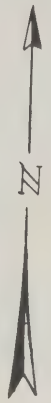
SURVEYED: JULY 3, 1968

FIG. 6-A3

MISSISSIPPI VALLEY

CONSERVATION AUTHORITIES BRANCH, DEP'T E.&R.M., G.G.G. 1968




# COXVALE LAKE

(CLARENDON TWP.)

DEPTH CONTOURS
AND RELATION OF
DEPTH TO TEMPERATURE

SURVEYED : JULY 2, 1968.

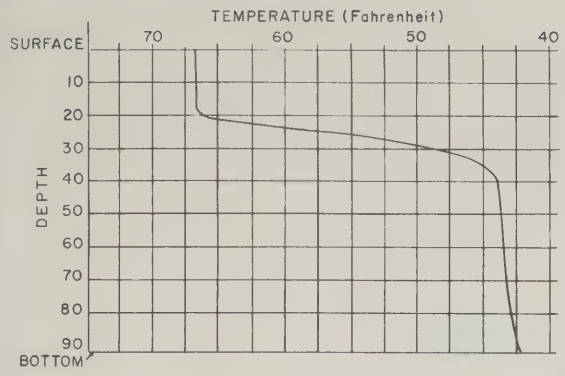


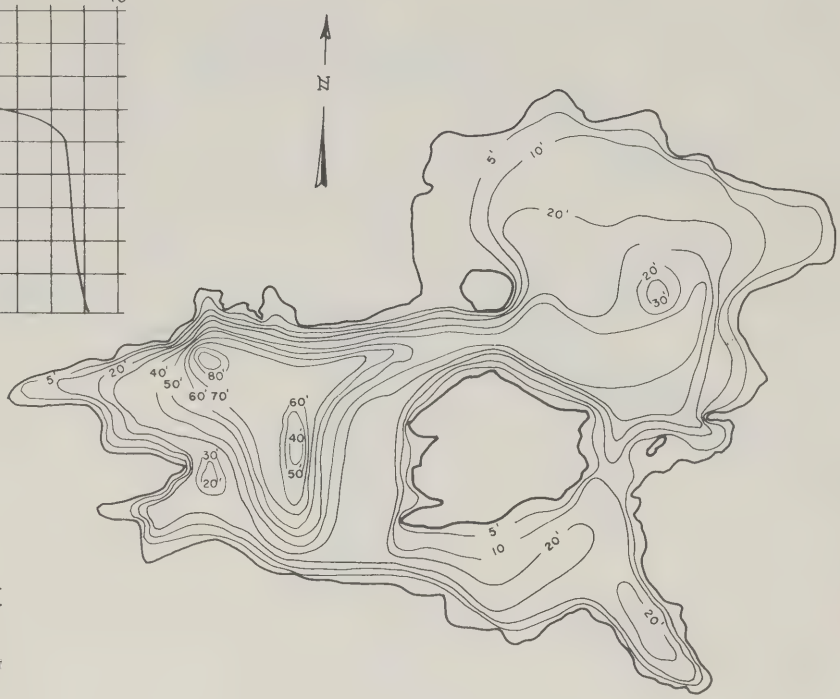


FIG. 6-A4

(NOT TO BE USED AS A NAVIGATIONAL CHART)

MISSISSIPPI VALLEY CONSERVATION AUTHORITIES BRANCH DEP'T. E.&R.M. T.L.L. 1968



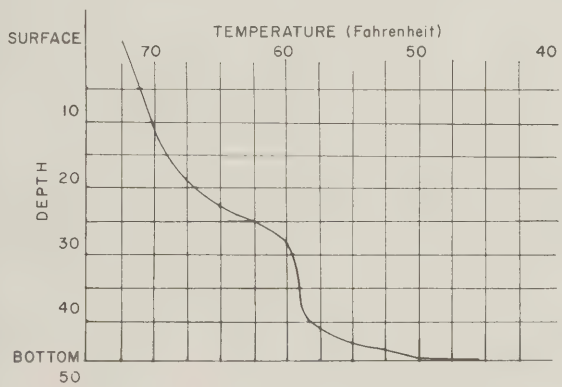

# BIG LAKE

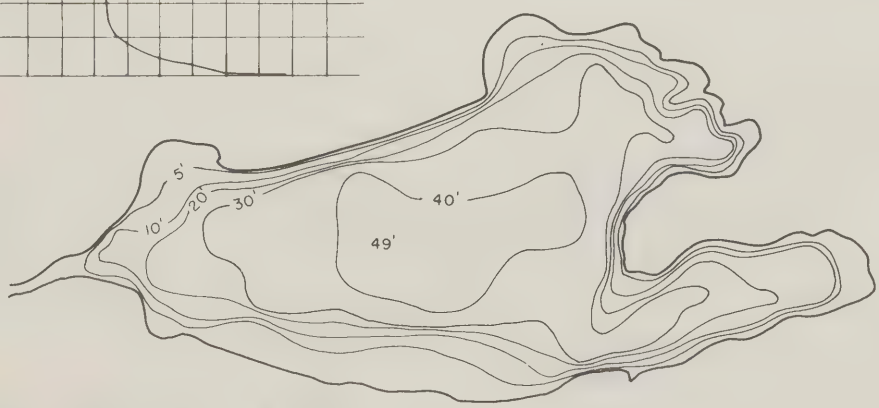
(MILLER TWP.)

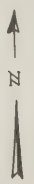
DEPTH CONTOURS
AND RELATION OF
DEPTH TO TEMPERATURE


SURVEYED: JULY 23, 1968

(THESE MAPS ARE NOT NAVIGATIONAL CHARTS)




# ARDOCH (GREEN) LAKE

(CLARENDON TWP.)

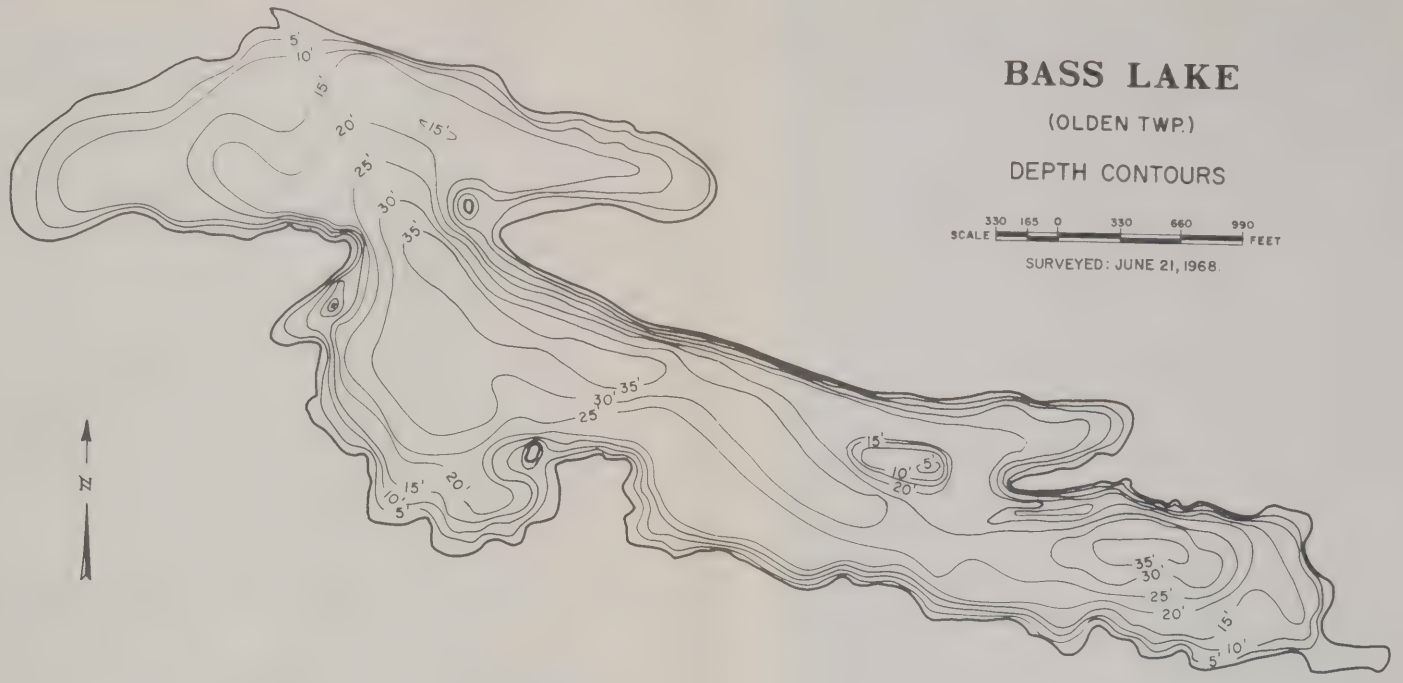
DEPTH CONTOURS
AND RELATION OF
DEPTH TO TEMPERATURE


SURVEYED JULY 15, 1968

FIG. 6-A5

MISSISSIPPI VALLEY

CONSERVATION AUTHORITIES BRANCH DEP'T. E.&R.M. T.L.L. 1968




# BASS LAKE

(OLDEN TWP.)

DEPTH CONTOURS

SCALE 330 165 0 330 660 990 FEET

SURVEYED: JUNE 21, 1968.

(THESE MAPS ARE NOT NAVIGATIONAL CHARTS)

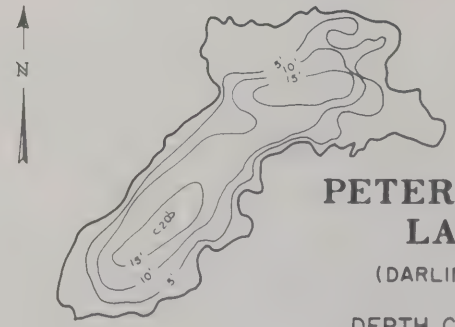

# LITTLE CANOE LAKE

(OLDEN TWP.)

DEPTH CONTOURS

SCALE 250 125 0 250 500 750 FEET

SURVEYED: JUNE 24, 1968.




# PETER WHITE LAKE

(DARLING TWP.)

DEPTH CONTOURS

SCALE – FEET

330 165 0 330 660 990

SURVEYED: JUNE 22, 1968.

FIG. 6-A6

MISSISSIPPI VALLEY

CONSERVATION AUTHORITIES BRANCH DEP'T. E. & R. M. T.L.L. 1968

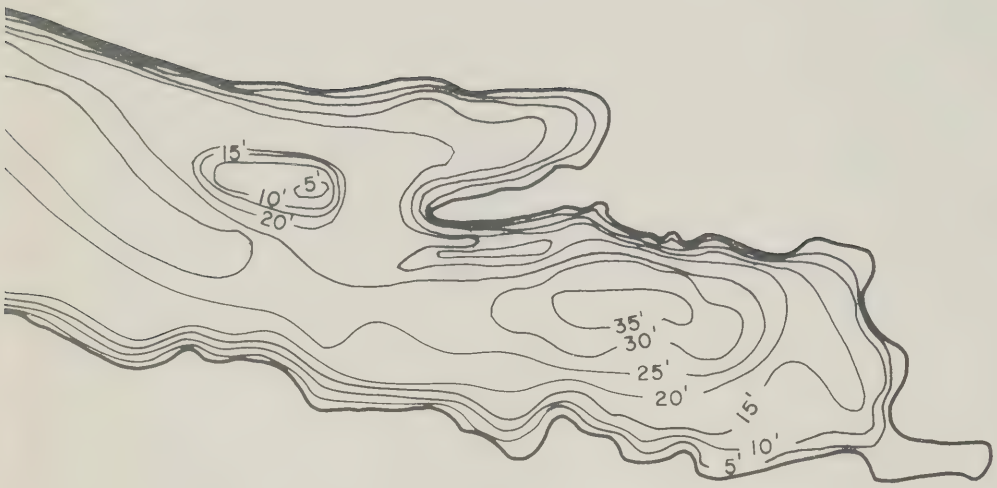
# BASS LAKE

(OLDEN TWP.)

DEPTH CONTOURS

330 165 0 330 660 990
SCALE FEET

SURVEYED: JUNE 21, 1968.

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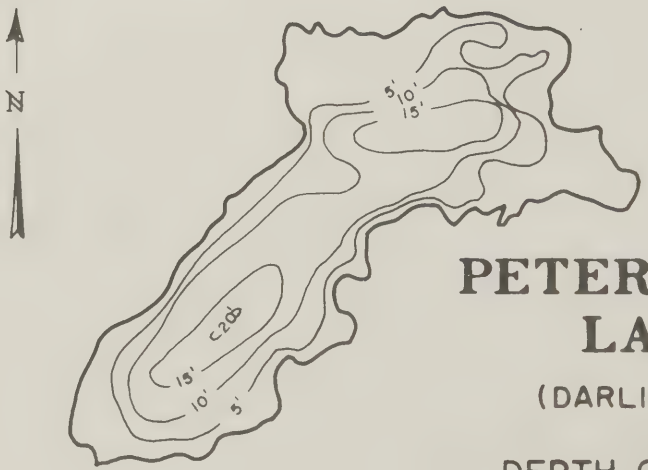



# PETER WHITE LAKE

(DARLING TWP.)

DEPTH CONTOURS

SCALE – FEET

330 165 0 330 660 990

SURVEYED: JUNE 22, 1968.

FIG. 6 - A6

CONSERVATION AUTHORITIES BRANCH DEP'T. E. & R. M. T.L.L. 1968

# BLACK LAKE

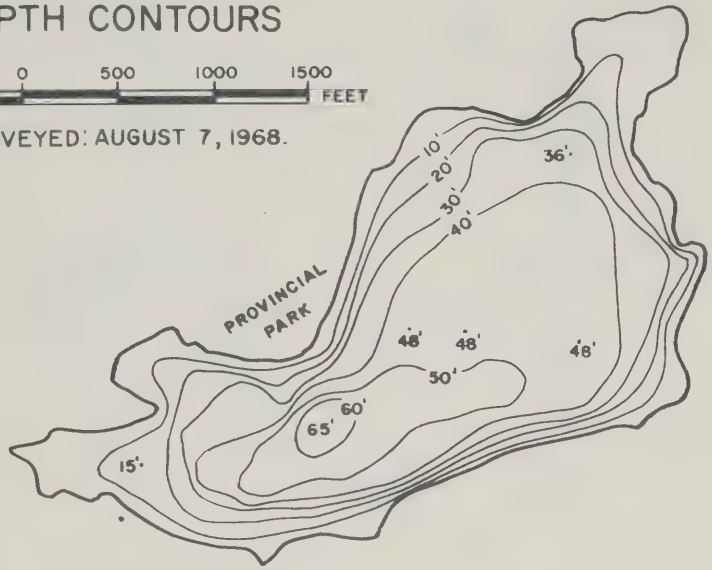
(OLDEN TWP.)

DEPTH CONTOURS

500 250 0 500 1000 1500

SCALE FEET

SURVEYED: AUGUST 7, 1968.




(THESE MAPS ARE NOT NAVIGATIONAL CHARTS.)

# SAMUEL LAKE

(LANARK TWP.)

DEPTH CONTOURS

500 250 0 500 1000 1500

SCALE FEET

SURVEYED: AUGUST 17, 1968.

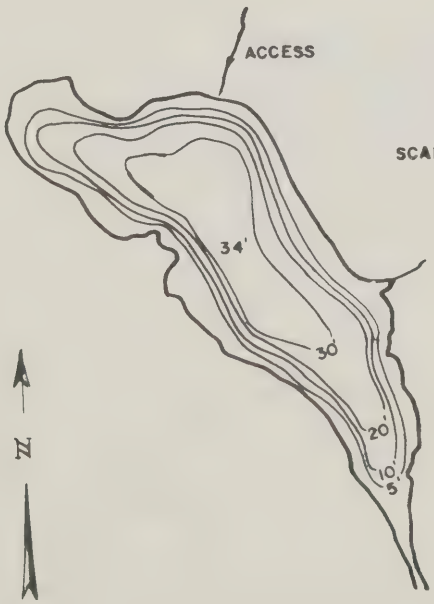



FIG. 6-A7

MISSISSIPPI VALLEY CONSERVATION AUTHORITIES BRANCH DEP'T. E.&R.M. T.L.L. 1968

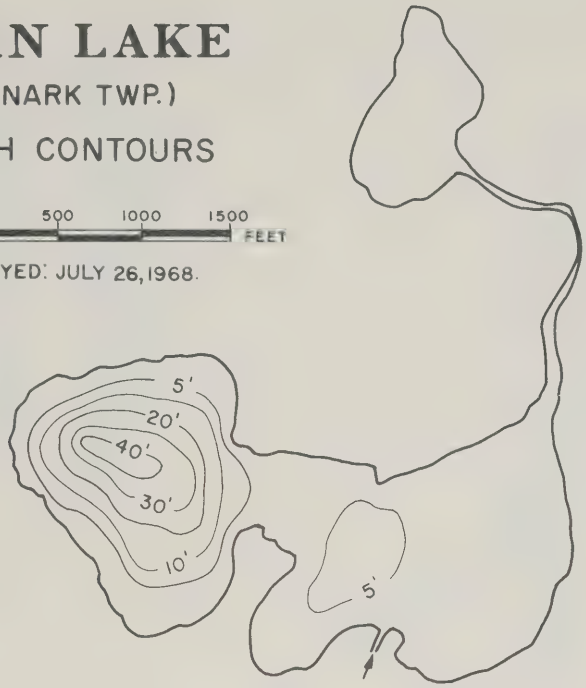
# HORN LAKE

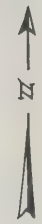
(LANARK TWP.)

DEPTH CONTOURS

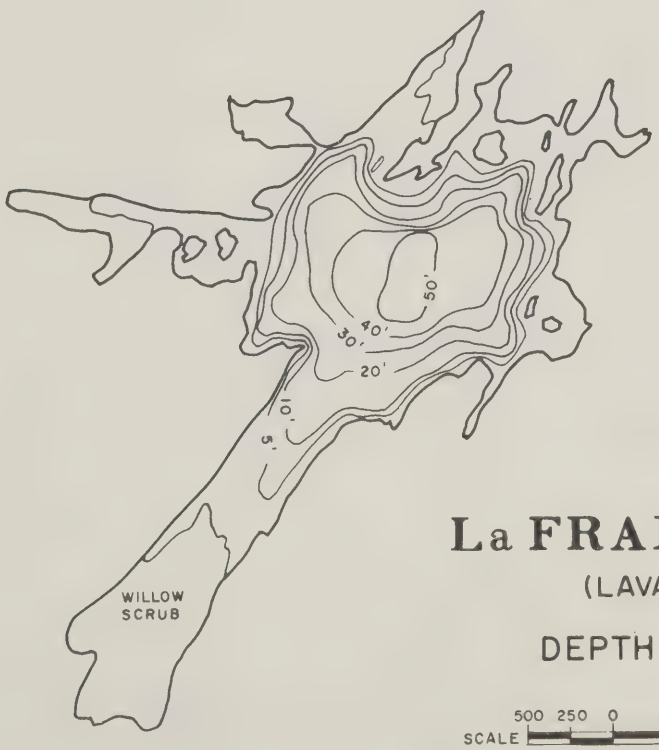
500 250 0 500 1000 1500
SCALE FEET

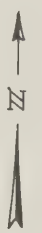
SURVEYED: JULY 26, 1968.




(THESE MAPS ARE NOT NAVIGATIONAL CHARTS)




# La FRANCE LAKE

(LAVANT TWP.)

DEPTH CONTOURS

500 250 0 500 1000 1500
SCALE FEET

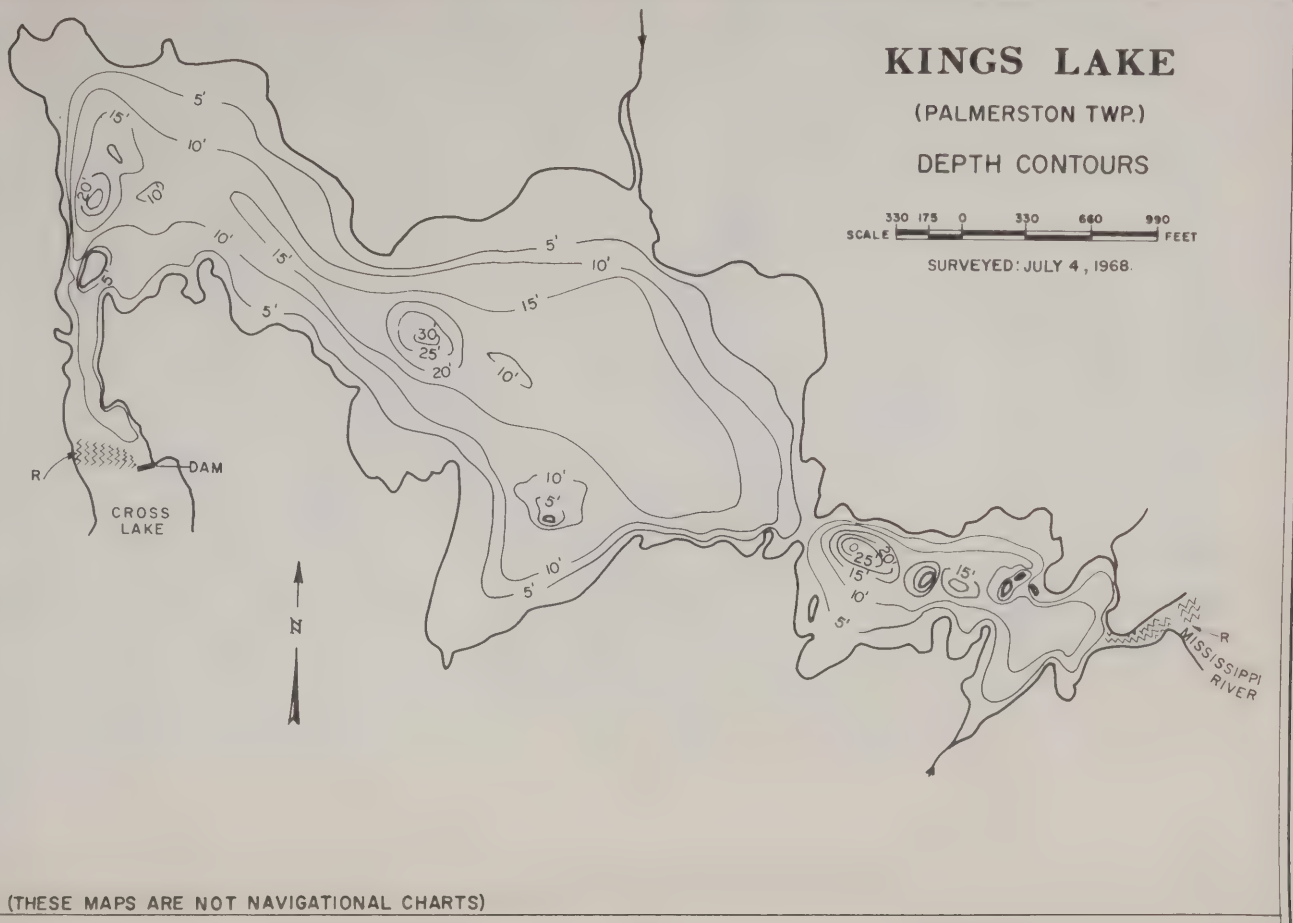
SURVEYED: JULY 25, 1968.

FIG. 6-A8

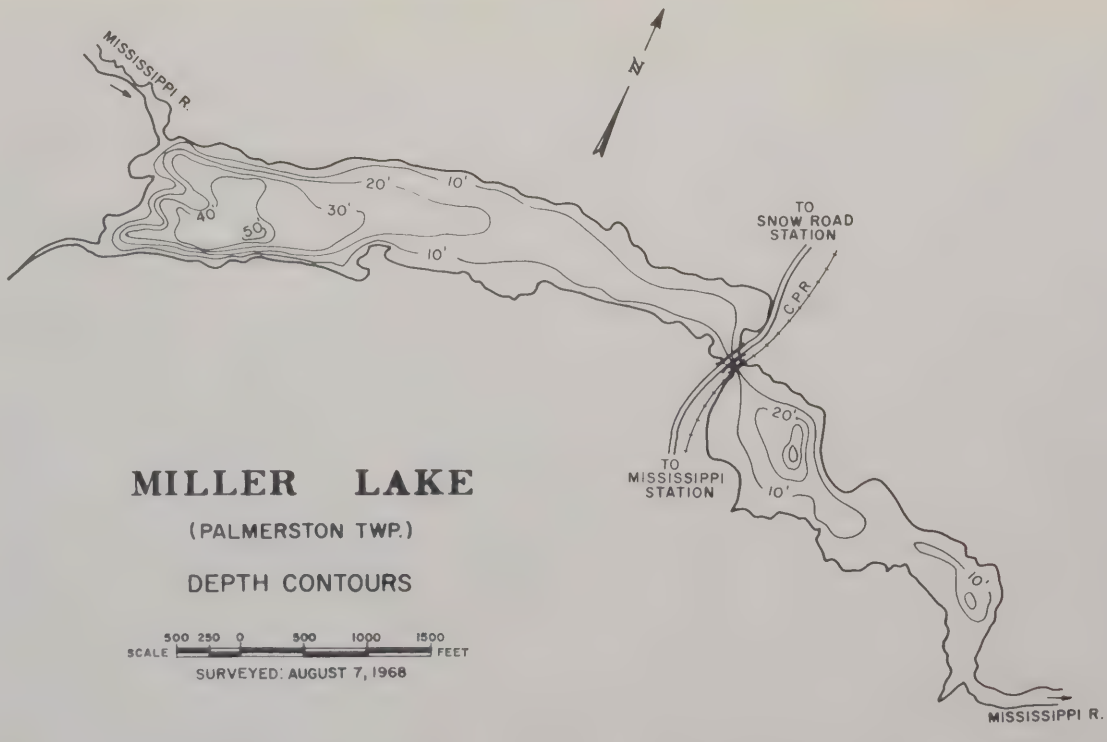
MISSISSIPPI VALLEY

CONSERVATION AUTHORITIES BRANCH DEP'T. E. & R.M. T.L.L. 1968


(THESE MAPS ARE NOT NAVIGATIONAL CHARTS)




(THESE MAPS ARE NOT NAVIGATIONAL CHARTS)




# MILLER LAKE

(PALMERSTON TWP.)

DEPTH CONTOURS

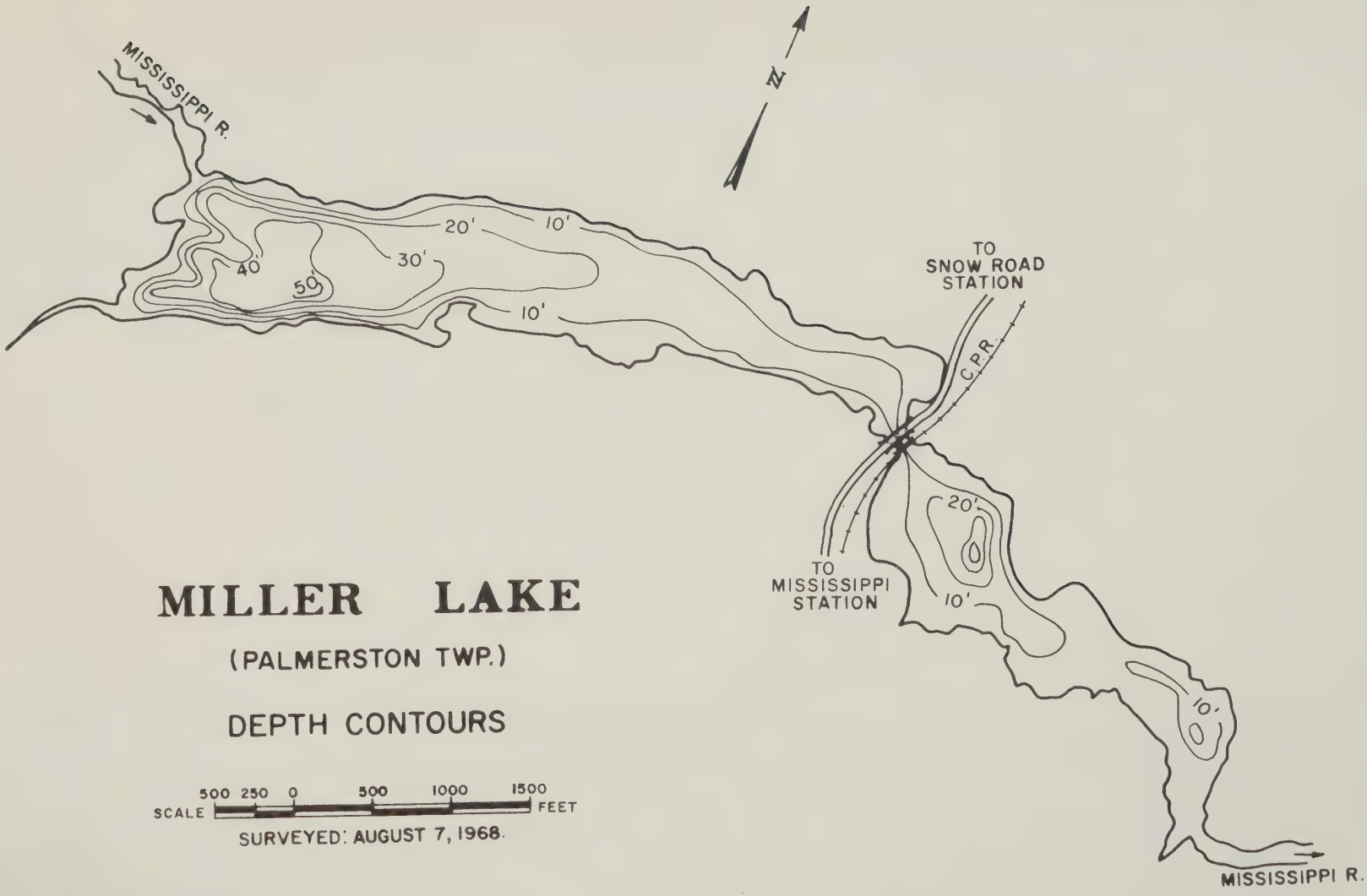
500 250 0 500 1000 1500
SCALE FEET

SURVEYED: AUGUST 7, 1968

FIG. 6-A9

MISSISSIPPI VALLEY

CONSERVATION AUTHORITIES BRANCH DEP'T E. & R.M. T.L.L. 1968




# MILLER LAKE

(PALMERSTON TWP.)

DEPTH CONTOURS

SCALE 500 250 0 500 1000 1500 FEET

SURVEYED: AUGUST 7, 1968.

FIG. 6-A9

MISSISSIPPI VALLEY

CONSERVATION AUTHORITIES BRANCH DEP'T. E. & R.M. T.L.L. 1968

# BARR LAKE

## DALHOUSIE TWP.

LEGEND

Dense Cattail Bog

Dense Aquatic Vegetation

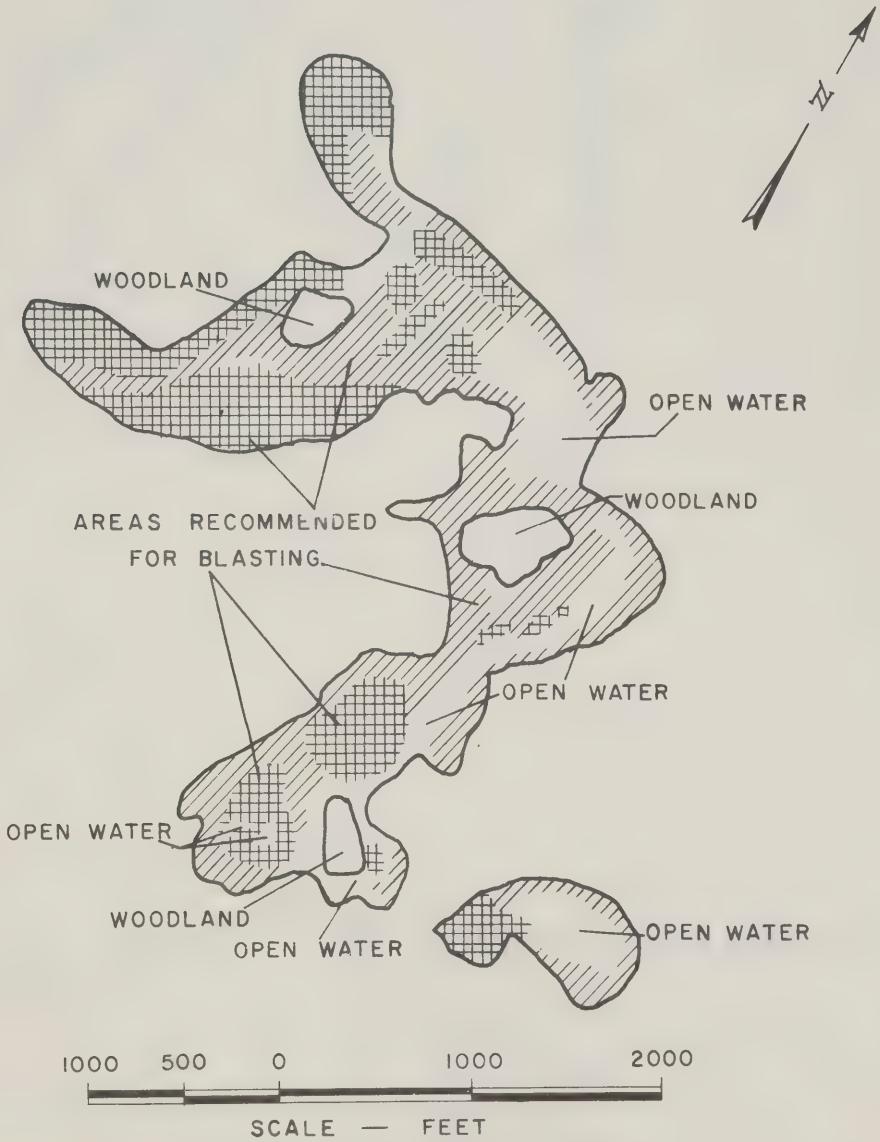



FIG. 6-A10

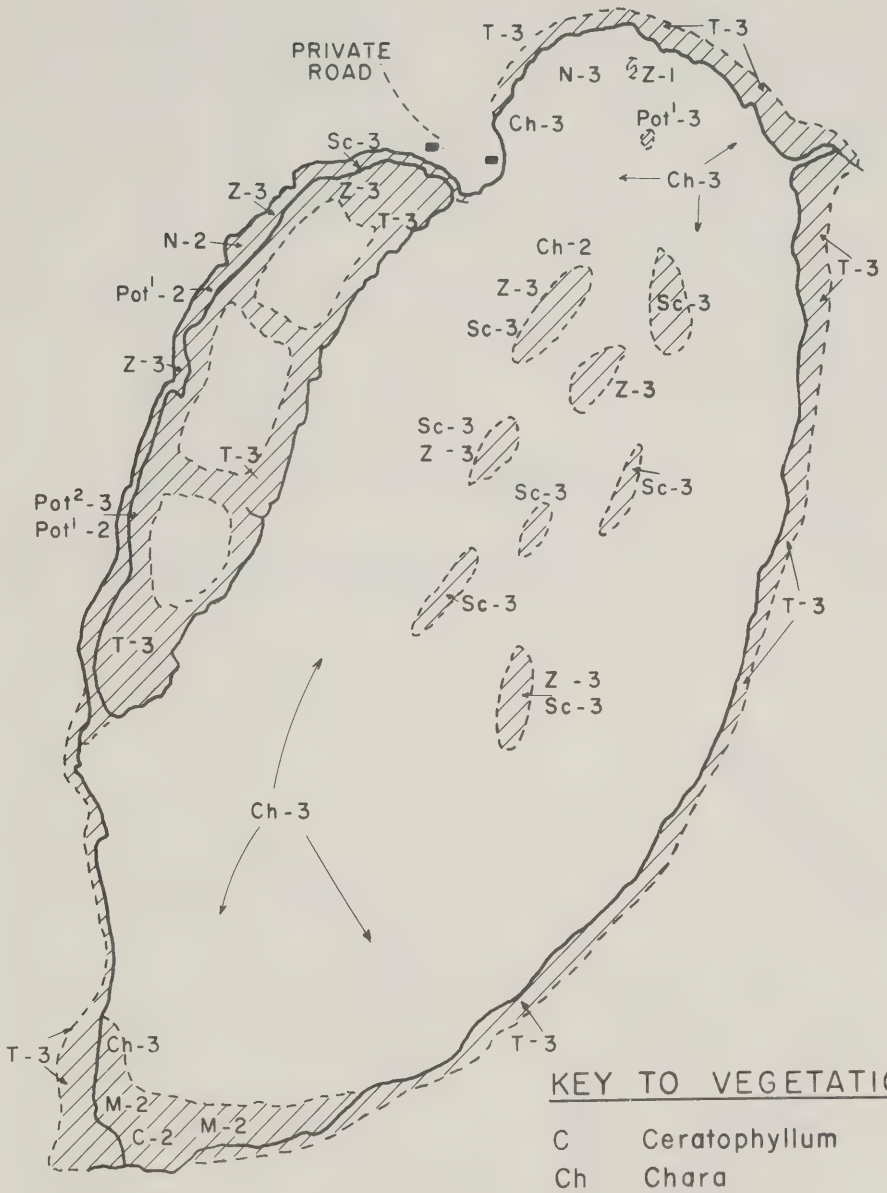
MISSISSIPPI VALLEY

CONSERVATION AUTHORITIES BRANCH Dep't. E.&R.M. 1968

# HALEY LAKE

DRUMMOND TWP.

SCALE 1000 0 1000 2000 FEET




## DENSITY OF VEGETATION

1 Occurs
2 Sparse
3 Common to abundant

## KEY TO VEGETATION SPECIES

| | |
|---|---|
| C | Ceratophyllum |
| Ch | Chara |
| M | Myriophyllum |
| N | Nymphaea |
| Pot¹ | Potamogeton¹ |
| Pot² | Potamogeton² |
| Sc | Scirpus |
| T | Typha |
| Z | Zizania (Wild Rice) |

FIG. 6-A11

MISSISSIPPI VALLEY CONSERVATION AUTHORITIES BRANCH Dep't. E. & R.M. 1968

# MISSISSIPPI LAKE

## BECKWITH AND DRUMMOND TWP.

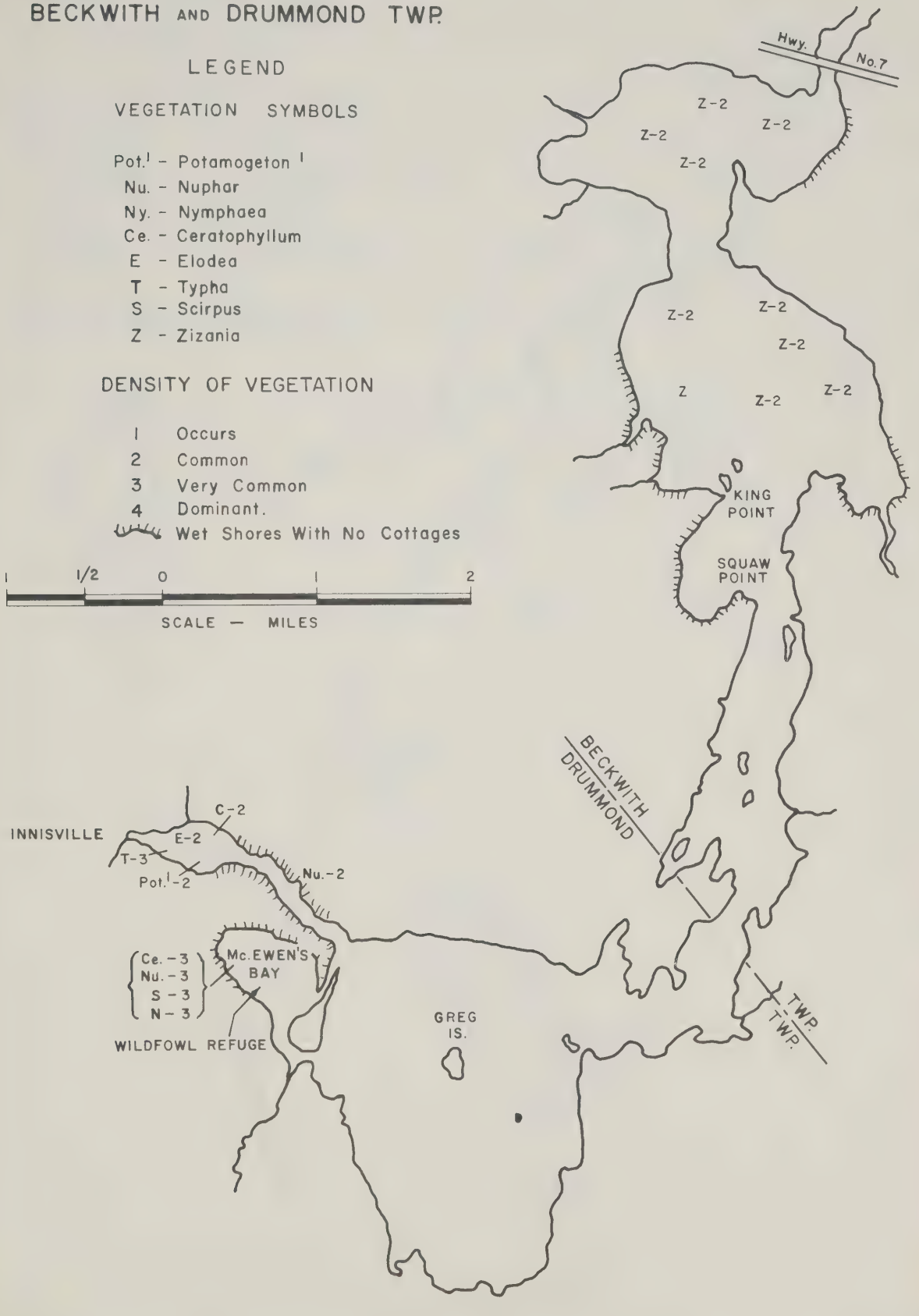



FIG. 6-A12

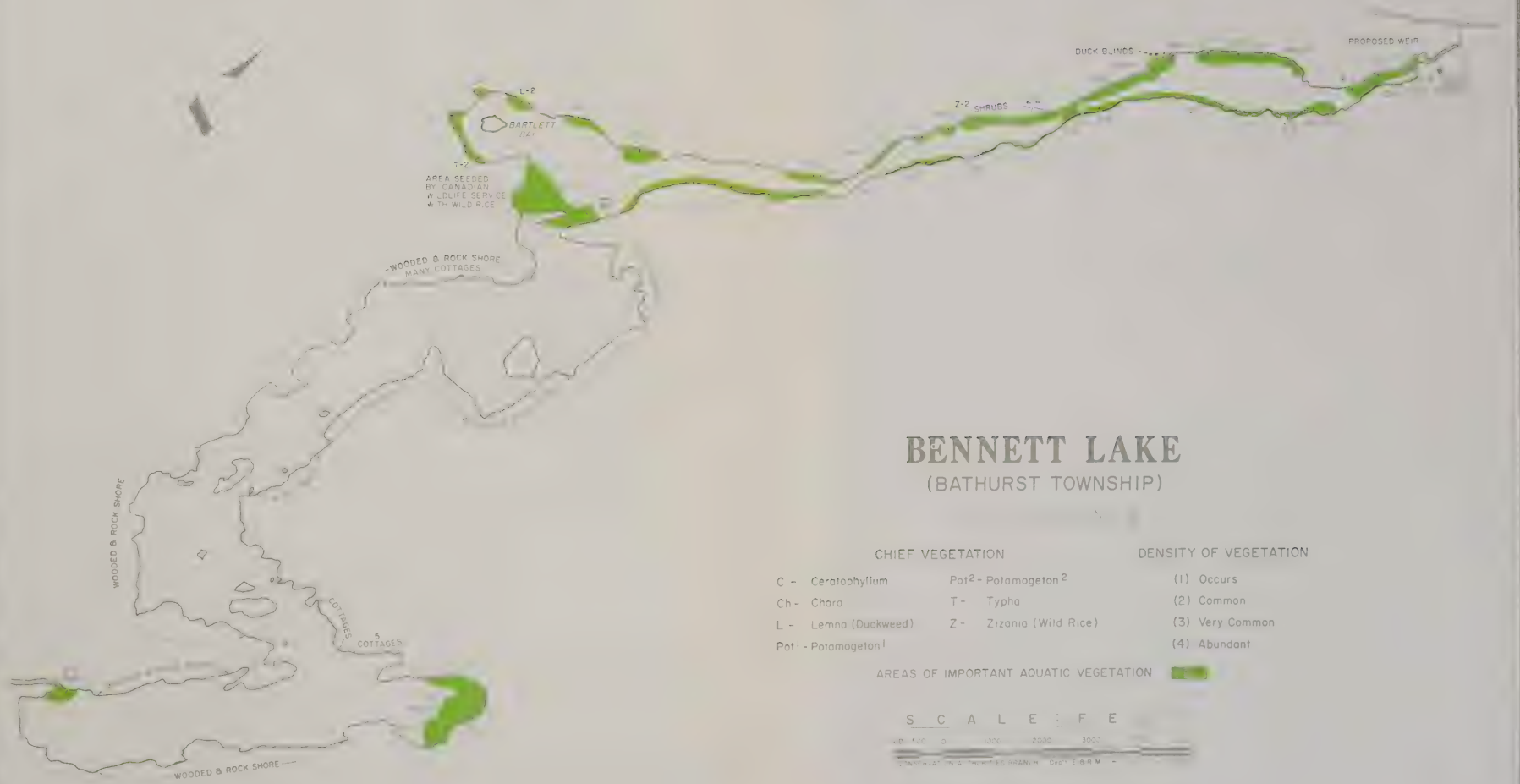
IMPOUNDMENT ABOVE

# HIGH FALLS DAM

(DALHOUSIE TWP.)


FIG. 6-A13

CONSERVATION AUTHORITIES BRANCH, Dep't E.R.&M. W.A.C. 1969




# BENNETT LAKE

## (BATHURST TOWNSHIP)

CHIEF VEGETATION

C - Ceratophyllum
Ch - Chara
L - Lemna (Duckweed)
Pot¹ - Potamogeton¹
Pot² - Potamogeton²
T - Typha
Z - Zizania (Wild Rice)

DENSITY OF VEGETATION

(1) Occurs
(2) Common
(3) Very Common
(4) Abundant

AREAS OF IMPORTANT AQUATIC VEGETATION

SCALE: FEET

0 1000 2000 3000

FIG. 6A-14


# BENNETT LAKE

## (BATHURST TOWNSHIP)

L E G E N D

CHIEF VEGETATION

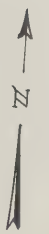
C - Ceratophyllum
Ch.- Chara
L.- Lemna (Duckweed)
Pot[1] - Potamogeton[1]
Pot[2] - Potamogeton[2]
T.- Typha
Z.- Zizania (Wild Rice)

DENSITY OF VEGETATION

(1) Occurs
(2) Common
(3) Very Common
(4) Abundant

AREAS OF IMPORTANT AQUATIC VEGETATION

FIG. 6A-14


# MACHESNEY LAKE

(EFFINGHAM TWP.)

DEPTH CONTOURS

SCALE 250 125 0 250 500 750 FEET

SURVEYED: AUGUST 8, 1968

(THESE MAPS ARE NOT NAVIGATIONAL CHARTS)


# STOLL LAKE

(EFFINGHAM TWP.)

DEPTH CONTOURS

SCALE – FEET

500 250 0 500 1000 1500

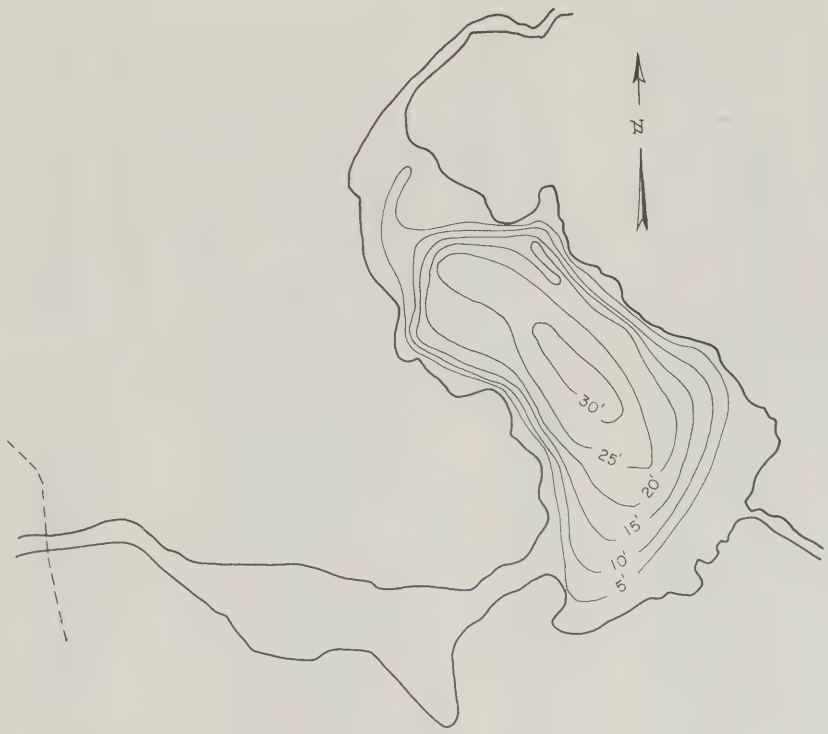
SURVEYED: JULY 16, 1968

FIG. 6-A15

MISSISSIPPI VALLEY

CONSERVATION AUTHORITIES BRANCH, DEP'T. E.&R.M., P.D.T. 1968

(THESE MAPS ARE NOT NAVIGATIONAL CHARTS)



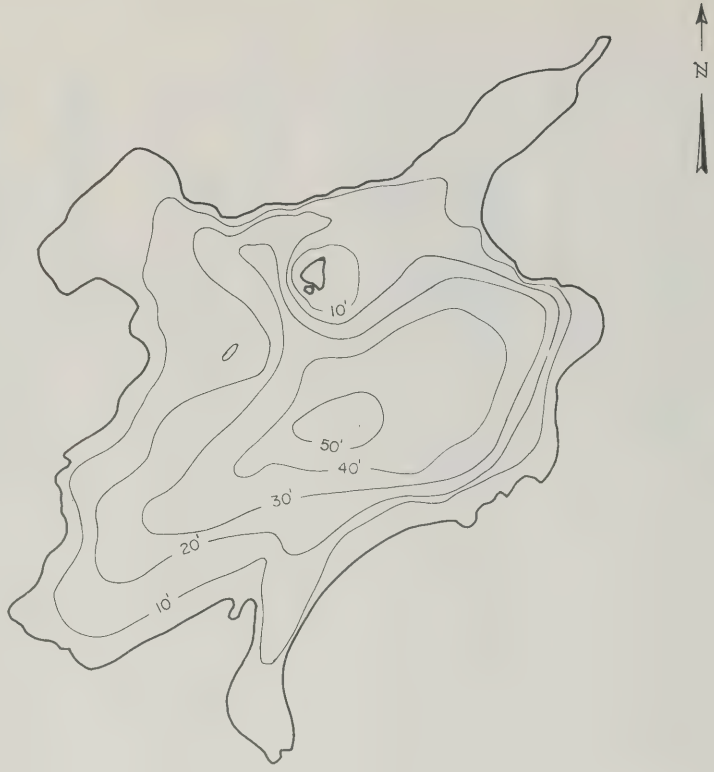

# TURTLE LAKE

(CLARENDON TWP.)

DEPTH CONTOURS

SCALE 1000 500 0 1000 2000 FEET

SURVEYED JULY 20, 1968




# O'REILLY LAKE

(OLDEN TWP.)

DEPTH CONTOURS

SCALE 660 330 0 660 1320 FEET

SURVEYED JUNE 24, 1968

FIG. 6-A16

MISSISSIPPI VALLEY

CONSERVATION AUTHORITIES BRANCH, DEP'T. E.B.R.M., G.G.G. 1968

LANARK TOWNSHIP

Samuel Lake, to which there is at present access only by land-rover, has much aquatic vegetation. No sport species were found in this lake.

LAVANT TOWNSHIP

LaFrance Lake: There is reported to be an excellent population of smallmouth bass in this lake, which has three cottages on it. One large mass of algae was seen, but the source of enrichment of the lake is not known. Other fish known to be in the lake include largemouth bass, bluegills, and northern pike.

MILLER TOWNSHIP

Big Lake: There is a good natural sand beach at the northeast corner of this lake. Approximately 25 smallmouth bass spawning beds were seen.

OLDEN TOWNSHIP

Bass Lake: There are seven cottages on this lake. Vegetation, chiefly coarse Pondweeds and Water-lilies, is mainly confined to the extreme east and west ends. Fish identified included smallmouth bass and bluegills.

PALMERSTON TOWNSHIP

Kings Lake: There is a resort on this lake and five cottages. The level of the lake is in part controlled by the flow from the dam at the west end at the outlet of Cross Lake and by rapids at the east end of Kings Lake itself. There is very little aquatic vegetation in the lake. This lake was not fished.

## LAKES FOR WHICH NO MAPS ARE INCLUDED IN THIS REPORT

BLITHFIELD TOWNSHIP

Bartraw Lake lies on Depot Creek which drains into Clyde Lake. It covered 39 acres when examined on August 14, 1968. The bottom of the lake is chiefly silt, with scattered patches of bare rock. Most of the lake is surrounded by dead trees presumably through the effects of beaver dams. Recent beaver activity was apparent. Most of the lake is between 15 and 30 feet deep, with a small section more than 40 feet deep. The edge is fringed with mixed Cattails and Water-lilies. During the survey only perch were caught in this lake.

DARLING TOWNSHIP

Roberts Lake has access from County Road 9. This lake drains into the Indian River. The area of the lake is only about 20 acres. About half of

the lake is more than 20 feet deep, with a maximum depth of 50 feet. One-half of the shoreline consists of sedges with many dead trees, and the edge of the lake all around is covered with aquatic vegetation. Because of the ease of access there are already 13 cottages on this lake. At the time of survey only northern pike and coarse fish were found in the lake.

## DENBIGH TOWNSHIP

Rolufs Lake covers 32 acres and drains into Kilpecker Creek. At the northern end there is an area of four acres of aquatic vegetation including coarse Pondweeds. There are also small areas of Cattail along the edge of the southern half which has an average depth of only four feet. In the remaining part of the lake there is a long oval depression going down to a depth of 34 feet. This lake is reported to have brook trout in it.

## LANARK TOWNSHIP

1. Baxter Lake has an access lane from the Lanark-Hopetown Road. Its area is 32 acres. The south-eastern shore is rocky while the northern edge has much aquatic vegetation. The lake is surrounded by wooded land. Most of the lake is more than 10 feet deep, with a large section varying in depth from 20 to 29 feet. In all of the shallower parts of the lake the bottom is covered with the algae Chara. Northern pike and perch are the chief fish species in this lake.

2. Craig Lake was inaccessible by car in 1968. On August 19, 1968, it was found to be virtually two small lakes connected by a narrow channel, the whole surrounded by a very wet marsh with Chara, Labrador-tea (Ledum greenlandicum) and sedges. The lake appeared to be of no significance for fishing, the maximum depth being 15 feet. Several species of minnows were seen, but no game fish were caught.

3. Reid Lake: This 23-acre-lake has one cottage on it, but the maximum depth of the lake was only nine feet. The lake bottom is covered with Chara. It contained many minnows.

4. Gillies Lake: This 63-acre-lake is mostly less than 15 feet deep but there is a small area of depth greater than 20 feet. It lies on a tributary of the Clyde River. There are three cottages on the lake. Most of the bottom has a fairly dense covering of Chara. Only sunfish were seen (probably pumpkinseeds).

5. Taylor Lake: This 700-acre-lake was examined and depth sounded on June 23, 1968. The lake was found to be very shallow with a maximum depth of nine feet reached in only two very small sections. The average depth of the lake is about seven feet but there are large areas which are less than five feet deep. The channel connecting Clayton Lake and Taylor Lake is hazardous for motor boat travel and is extremely narrow. By a co-operative effort the boat channel was formerly buoyed, but the buoys were not present when the lake was examined.

These two lakes were formerly used for water storage for a mill at the lower end of Clayton Lake. This mill has been sold and presumably will

not function again. A new dam to replace the old and dilapidated structure was in process of being built by the Department of Public Works in the fall and winter of 1968-69. It will control the level of both lakes. There is a very large number of stumps in Taylor Lake. The lake is almost ideal for northern pike and largemouth bass and both species were present when the lake was examined.

## LAVANT TOWNSHIP

Lavant Lake: This 81-acre-lake is extremely shallow, varying in depth from two to four feet, apart from a nine-acre patch which varies in depth from five to nine feet. The bottom is a soft ooze more than five feet thick.

The lake appears to be of no significance for sport fishing. However, sunfish were seen in the lake. This lake should not be confused with Lavant Long Lake in Concessions VII and VIII of Lavant Township.

## MILLER TOWNSHIP

1. Gorr Lake: This is a small lake of 26 acres, of which about one-half has a depth greater than ten feet, with a maximum depth of 22 feet. The southern and northern ends have a fair growth of coarse Pondweeds and Water-lilies, and there is a beaver lodge on the west side.

2. Shaw Lake: Three small lakes lie close to the road from Plevna to Wensley Lake. All three were echo-sounded on July 23, 1968. All drain in spring into a tributary of Buckshot Lake. The first and most northerly of the three is Shaw Lake, which covered 41 acres when examined, including a large bay with flooded dead trees. An area of nine acres is more than 25 feet deep and the maximum depth is 45 feet. An unnamed lake immediately south of Shaw Lake covered 32 acres. This lake had a large shallow silted bay at its outlet on the northwest corner, and two small pockets of water more than 60 feet deep.

3. Armstrong Lake: This 21-acre-lake receives the outflow of the unnamed lake mentioned above. It is circular and there is a fairly even gradient to a depth of 85 feet. It was reported that Armstrong Lake contains walleyes, northern pike and largemouth bass.

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Note: Contour maps are also included for the following lakes: Bon Echo Lake (Anglesea Twp.), Brooks Lake (Abinger Twp.), Little Canoe Lake (Olden Twp.), Black Lake (Olden Twp.), Horn Lake (Lanark Twp.), Miller Lake (Palmerston Twp.), Machesney Lake (Effingham Twp.), Stoll Lake (Effingham Twp.), Turtle Lake (Clarendon Twp.), and O'Reilly Lake (Olden Twp.).

TABLE A6-3

TWEED DISTRICT PLANTINGS 1968

BROOK TROUT

| Name of Waters | Township | No. of Fish Stocked |
|---|---|---|
| Brooks Lake | Abinger | 1,150 |
| Eno Lake | Denbigh | 1,650 |
| Feeny Lake | Effingham | 2,200 |
| Gregg Lake | Denbigh | 550 |
| Kilpecker Creek | Denbigh | 650 |
| Mieske Lake | Denbigh | 825 |
| Crooked Lake | Clarendon | 750 |
| Egg Lake | S. Canonto | 850 |
| Peye's Lake | Palmerston | 1,400 |
| Shoepack Lake | Barrie | 1,300 |

LAKE TROUT

| | | |
|---|---|---|
| Long Mallory Lake | Abinger | 450 |
| Green Lake | Clarendon | 350 |
| Grindstone Lake | Miller | 1,200 |
| Kishkebus Lake | Barrie | 650 |
| Mosque Lake | Miller | 1,800 |
| Palmerston Lake | Palmerston | 2,500 |
| Sharbot Lake | Oso | 3,600 |
| Silver Lake | Oso | 650 |

RAINBOW TROUT

| | | |
|---|---|---|
| Kilbourne Lake | Abinger | 1,050 |
| Grindstone Lake | Miller | 2,000 |
| Mosque Lake | Miller | 3,600 |

TABLE A6-4

KEMPTVILLE DISTRICT PLANTINGS PLANNED 1968

LARGEMOUTH BASS (fingerlings)

| Waters | Township | Quantity |
|---|---|---|
| Tulley's Pond | Lanark | 1,500 |

SMALLMOUTH BASS (fingerlings)

| Waters | Township | Quantity |
|---|---|---|
| Dalhousie Lake | Dalhousie | 1,000 |

LAKE TROUT (yearlings)

| Waters | Township | Quantity |
|---|---|---|
| Murray Lake | Darling | 1,500 |

BROOK TROUT (yearlings)

| Waters | Township | Quantity |
|---|---|---|
| Bottle Lake | Lavant | 2,000 |
| Dixon Lake | Lavant | 2,500 |
| Easton's Creek | Dalhousie | 500 |
| Murray Lake | Darling | 1,000 |
| Paul's Creek | Dalhousie | 250 |
| Peterwhite Lake | Darling | 500 |
| Trombley Lake | Dalhousie | 1,000 |

WALLEYE (eyed eggs)

| Waters | Township | Quantity |
|---|---|---|
| Mississippi Lake | Drummond and Beckwith | 2,000,000 |
| Mississippi River (above Appleton) | Ramsay | 600,000 |
| Mississippi River (above Pakenham) | Ramsay and Pakenham | 600,000 |
| Robertson Lake | Lavant | 1,000,000 |

2. Wildfowl

The aquatic vegetation of several of the lakes is described under the heading Fish, since it may be important for the habitat of pike and bass. In such cases it is not repeated under this heading.

In the following descriptions Potamogeton[1] includes species of narrow-leaved submersed Pondweeds such as Potamogeton pectinatus (Sago Pondweed), and other hybrids in which the seeds, foliage, stem and root are all eaten by wildfowl. Other Potamogetons with wide thick floating leaves and stout stems in which only the seeds and roots are eaten are classed together and named Potamogeton[2].

In the text the abundance of aquatic plants is indicated occasionally by a digit (from 1 to 4). In such cases the meanings of the digits are as follows:

1 means "Occurs",
2 means "Common",
3 means "Very Common", and
4 means "Abundant or Dominant".

ELPHIN LAKE (Palmerston Township)

Located in an isolated area, this shallow lake could possibly provide good cover for wildfowl in the fall. The major type of shoreline vegetation is floating bog of Heaths and Alder with some Cattail (Typha) interspersed. Nuphar and Nymphaea are present in the lake, about half of which is open water. Scirpus species and Potamogeton[2] are also present. No waterfowl were seen.

PADDY MARSH (Dalhousie Townships)

This small lake was accessible only by a fire road of the Department of Lands and Forests west of Poland. It had no surface aquatic vegetation and only Typha and Alder bog around the shore. No waterfowl were seen. The area showed no great possibilities for wildfowl production.

INDIAN CREEK (Pakenham Township)

This area was observed at its upper reaches near the Hydro line. Most of the land surrounding the creek is covered by water from beaver activity. One of the larger impoundments was examined. Most of the impoundment had trunks of dead trees present but these were not close enough to give adequate nesting cover for wildfowl.

The aquatic vegetation consisted of Lemna (Abundance 2), Elodea (Abundance 2), Myriophyllum (Abundance 1), and Sedges (Abundance 3). There were many fallen logs and fresh beaver cuttings observed. The area was suitable for Wood Duck nesting boxes.

The lower reaches of the creek appeared to have little possibility for wildfowl, unless changed from successive watering holes for livestock to a well-managed waterway.

AREA NORTH OF BELLAMY ROAD (Pakenham Township)

This is an area of about 500 acres. A traverse was made and several marshes examined. Beaver ponds are common. They contain chiefly Duckweed (Lemna), Nuphar, Potamogeton 2, Typha, Sedges (mainly Scirpus), and much algae. No wildfowl were seen, but the potential for them exists.

WOLVES GROVE (West of Almonte in Ramsay Township)

Many of the marshy areas were examined and a map was prepared of these. The Department of Lands and Forests proposes to purchase this area and to use it as a multiple-use project. Only one duck, a Blue-winged Teal, was seen, but the potential for a small wildfowl yield is present, in years of high precipitation.

BARR LAKE (Dalhousie Township)

Most of this lake is only two feet or less in depth and is clogged with aquatic vegetation and Cattail bog. Although the area appears to offer good waterfowl habitat, only 11 ducks were seen, five Wood Ducks and six unidentified ducks in one flock. This small number may be due to the very shallow water. The area is quite isolated. Aquatic vegetation included Potamogeton 1 and 2 (Abundance 3), Nymphaea (Abundance 3), Scirpus (Abundance 2), Myriophyllum (Abundance 2), Vallisneria (Abundance 1).

The ducks were seen in the more northern and deeper section. One area had a rock in the open, baited with oats scattered on it. No blinds were seen on this marsh.

MILLER LAKE (Palmerston Township)

The eastern section of Miller Lake, east of the road from Mississippi Station to Snow Road Station which passes across the narrows, provides excellent habitat for migrating wildfowl. Sago Pondweed and Eel Grass are both common in this area.

FALL RIVER

The section of the Fall River near Highway 7 was examined and mapped on September 9, 1968. It appeared to be in excellent condition for migratory waterfowl. Thirty-three ducks were observed (including 28 Wood Ducks, 1 Black Duck and 4 unidentified). No duck blinds were seen. Much Eel Grass had been pulled to the surface. There was in some sections an overabundance of Cattails.

INDIAN RIVER

The Indian River was examined from Concession X in Lanark Township to Clayton Lake. This part of the river supplies excellent wildfowl habitat in the fall. The part of the Indian River from Clayton Lake to Highway 29 was examined. This part of the river did not supply good wildfowl habitat, except near the second crossing of Side Road 20 where there were abundant duck foods and three Mallards were seen July 24, 1968.

THE MISSISSIPPI RIVER FROM DALHOUSIE LAKE TO HIGHWAY 511

This area was travelled by canoe on June 23, 1968. At this time of year it was too early for Wild Rice to be visible but in the deeper areas there was a very good assortment of aquatic vegetation for wildfowl, with abundant Waterweed (Elodea), Myriophyllum and Sago Pondweed, besides other wildfowl foods.

Many duck blinds were seen in this part of the river. There was particularly good habitat for breeding and feeding at the mouth of the creek running from Big Mud Lake.

THE CLYDE RIVER (Lavant Township)

This river was examined in detail in two different sections which differed greatly in their ability to produce and harbour wildfowl.

The first section, by far the more productive section, was the area from the sawmill at Clyde Forks to the shore of Joe Lake beside the road. The area is in Lavant Township, Lanark County, and was examined on August 14, 1968.

Wildfowl observed in this area from 6:00 a.m. to 8:00 a.m. on August 27, 1968, included the following:

| | | |
|---|---|---|
| Wood Duck | 21 | |
| Blue-winged Teal | 20 | |
| Pintail | 3 | |
| Mallard | 2 | |
| Unidentified | 12 | (Probably Wood Ducks or Teal) |
| | 58 | |

Since many ducks were probably missed on this survey, it is a safe assumption that there were more than 100 ducks on this small section of river in the two hours of observation. Eight Grebes, six Coots, and two Loons were also seen.

The second section included the area from Brightside to the sawmill east of Hopetown. The river appeared to be unattractive to wildfowl, apart from a few widely separated pools containing Wild Rice and Sago Pondweed. Only two ducks (Blue-winged Teal), were seen on this section of river.

BIG MUD LAKE (Dalhousie Township)

This lake was examined on August 21, 1968. It appears to be an excellent area for migrating wildfowl. The lake is shallow, approximately three feet deep, with a silt bottom. The lake is covered with beds of Scirpus, Nymphaea and one area of Cattails. The lake bottom is covered with Chara. There was a noticeable absence of Potamogeton[1]. The Wild Rice bed at the mouth of the effluent to the Mississippi River was heavily grazed.

THE LOWER FALL RIVER AND LOWER MUD LAKE (Bathurst Township)

This area appears to be excellent wildfowl habitat. Wild Rice, Lemna and Vallisneria all provide first class food supplies. There is a

shortage of Pondweed. Typha and shore maples provide good cover. Twenty-three duck blinds were seen in the river, which is six to ten feet deep and easily accessible from the Mississippi River by boat.

UPPER MUD LAKE (Bathurst Township)

This lake extends over less than ten acres and is surrounded by floating heaths. Access is only available through farmland from the road south of Fallbrook. There are scattered Pondweeds of both types.

HALEY LAKE (Drummond Township)

Haley Lake, of which a map accompanies this report, produces few, if any, ducks, but is an example of those relatively small lakes which can be made to attract large numbers of pond ducks in the fall. It is leased by a private hunting club. The lake has a maximum depth of about two feet and the bottom is a soft ooze. Chara grows on most of the bottom and there are considerable areas of Scirpus and Zizania (Wild Rice), both in the centre and on the west side.

The edge is chiefly a narrow band of Typha, which provides some cover. Sixty Black Ducks were on the lake when it was visited on August 13, 1968. This lake has given consistently good hunting over a long period.

SOUTH CLYDE RIVER

There is a large area of marshland water in the general vicinity of the former railroad tracks south-west of Clyde Forks. In 1968, the roadbed of the former railroad tracks was inundated, presumably due to the activities of beaver. The vegetation of this large area was not checked. It appears unlikely that it will provide much breeding habitat for wildfowl on a permanent basis.

MISSISSIPPI LAKE (Beckwith, Drummond and Ramsay Townships)

This lake is already a very good area for wildfowl. The principal species found there during the fall are Black Ducks, Mallards, Wood Ducks, and Lesser and Greater Scaups. There are also Goldeneyes and occasionally Scoters. The area already provides excellent hunting from many blinds on the lake. There is a report of 80 ducks having been taken from seven blinds in one day. It is felt that there are possibilities for 80 blinds which would provide more than 1,000 man-days of hunting per season. The Department of Lands and Forests intends to purchase some of the land surrounding Lower Mississippi Lake. The Department is currently protecting the Wild Rice beds in the bays. These extend out into water depths of approximately ten feet. Canada Geese have hatched successfully for the last few years in King Bay. There is also considerable trapping of muskrats.

McEWEN BAY

This bay is a part of Mississippi Lake and is located south of Innisville. The bay has been a bird sanctuary since 1959. The land is privately owned. There are reports of Black Ducks and Mallards in this bay numbering from 10,000 to 20,000 in the fall. The area is also set apart as a

fish sanctuary after September 15, to prevent conflict between anglers and hunters.

MANION CORNERS MARSH (Huntley Township)

Of three parallel marshes shown on the topographic sheets of Huntley Township (all examined by wildlife staff), only one appeared to be worth noting for its production and harbouring of wildfowl. This one, in Concession IX, Lots 9-11, of Huntley Township, shows a remarkable resemblance to some parts of the well known Luther Marsh. Where water is present, it is about two feet deep and lies in a large area of mixed clumps of Cattail, Willows, Alder, Dogwood and Sedges with small stretches of open water. Lemna is abundant, as is also submersed vegetation such as Myriophyllum and Potamogeton.

On both occasions when this area was visited, many Black Ducks and Mallards were seen and a great many more were heard. This is a large and somewhat isolated area. Shooting and retrieving is difficult in this marsh because of the abundant tall Alder, Willow and Dogwood. The area is part of the headwaters of Cody Creek.

HORN LAKE AND LITTLE LAKE (Lanark Township)

These two interconnected lakes lie south-west of Hopetown on a tributary of the Clyde River. Both have a narrow fringe of useful aquatic vegetation. However, the main significance of these lakes lies in the fact that they and their connecting waterway are almost surrounded by what is now a sterile dense Cattail bog. There were, in 1968, three beaver dams between these lakes and Hopetown. These dams raise the water level approximately two feet. There is only one cottage on Horn Lake.

IMPOUNDMENT ABOVE HIGH FALLS DAM (Dalhousie Township)

This large impoundment is significant in that it contains along its edges considerable quantities of useful wildfowl foods, as shown on the accompanying map.

There are slight fluctuations in the water level caused by the power generating station at High Falls. There is a fixed minimum below which the level cannot go, but the maximum depends upon spring runoff and summer storms. This is affected by the amount of water released at the Cross Lake dam. It is believed that after the spring runoff, the level of the impoundment does not normally vary by more than about one foot. The areas containing plants of use to wildfowl should, therefore, be very useful.

BENNETT LAKE (Bathurst Township)

This lake is an expansion of the Fall River. It now provides exceptional food for migrating wildfowl. Wild Rice was introduced at the west end by the Canadian Wildlife Service, and the rice has spread over many areas close to the shore where the depth is less than four feet.

MUD LAKE (Clarendon Township)

This area is an expansion of the Mississippi River in Lots 28-30, Concessions I - III of Clarendon Township. The widened area of the river is about two miles long. Most of the area, apart from the central channel, provides excellent food for migratory wildfowl, but good interspersion of cover is lacking so the lake probably does not produce any wildfowl.

There were approximately 15 duck blinds in the eastern part of this lake near the south shore, and several others scattered in various parts of the lake. A map showing the vegetation of the lake is available to the Authority.

3. The Fauna and Flora of the Mississippi Region

b. List of Mammals

The following list is made from reports by the survey staff, from various other people, from records of the Department of Lands and Forests, and from the ranges shown in Peterson's Mammals of Eastern Canada*. The order and names follow those of R. L. Peterson's 1966 list.

| | |
|---|---|
| Common Shrew (Sorex cinereus) | This is the commonest shrew, found both in forested and agricultural land. |
| Smoky Shrew (Sorex fumeus) | Less common than the preceding species. |
| Water Shrew (Sorex palustris) | Well within its range in this area. Found in or near small streams in woodlands. |
| Pygmy Shrew (Microsorex Hoyi) | This is the smallest North American mammal, and a mature specimen may not weigh more than a ten-cent coin. Uncommon. |
| Big Short-tailed Shrew (Blarina brevicauda) | A very common shrew in this area, found both in woodlands and open country. |
| Hairy-tailed Mole (Parascalops breweri) | In the centre of its range in this region. |
| Star-nosed Mole (Condylura cristata) | A fairly common mole of this region, often found under logs and old boards and around barns. |
| Little Brown Bat (Myotis lucifugus) | Common. |

* Peterson, R. L., Mammals of Eastern Canada, Oxford University Press, Toronto, 1966.

| | |
|---|---|
| Eastern Long-eared Bat (Myotis Keenii) | Rather uncommon, but has been collected in the area. |
| Least Bat (Myotis subulatus) | The area is in the centre of the range of this bat. |
| Silver-haired Bat (Lasionycteris noctivagans) | This bat is present in the area only in the summer and it appears that the species migrates to the southern part of the United States for the winter. |
| Eastern Pipistrelle (Pipistrellus subflavus) | A migratory species which has been collected in the area. |
| Big Brown Bat (Eptesicus fuscus) | Common in this region. |
| Red Bat (Lasiurus borealis) | Migratory. A rare summer resident. |
| Hoary Bat (Lasiurus cinereus) | This large solitary bat prefers forested areas. |
| Varying Hare (Lepus americanus) | Abundant in this area at varying intervals. |
| European Hare (Lepus europaeus) | Common in open fields, in the eastern sector of the valley. |
| Cottontail (Sylvilagus floridanus) | Common in suitable territory. |
| Eastern Gray Squirrel (Sciurus carolinensis) | This squirrel comes in one of two colour phases, grey or black. Most of those in this area are black. |
| Red Squirrel (Tamiasciurus hudsonicus) | A very common squirrel of which there are records and specimens from this area. |
| Woodchuck (Marmota monax) | Very common in the open lands. |
| Eastern Chipmunk (Tamias striatus) | Common in or around hardwood forests. |
| Eastern Flying Squirrel (Glaucomys volans) | Close to the eastern edge of its range in this area. |
| Northern Flying Squirrel (Glaucomys sabrinus) | In the centre of its range in the region. |
| Beaver (Castor canadensis) | Very common in 1968, particularly in the western wooded section. |

| | |
|---|---|
| Deer Mouse (Peromyscus maniculatus) | Common in forested areas. |
| Whitefooted Mouse (Peromyscus leucopus) | Common. Prefers woodlands with coniferous vegetation. |
| Bog Lemming (Synaptomys cooperi) | Apparently not yet collected in this region, but it probably occurs there. |
| Red-backed Mouse (Clethrionomys gapperi) | Well within its range in this area. |
| Meadow Vole (Microtus pennsylvanicus) | Common to abundant in agricultural land, less common in woodlands. This is the most abundant mammal in the eastern sector of the Mississippi Valley. |
| Common Muskrat (Ondatra zibethicus) | Common in or near water throughout the region. |
| Norway Rat (Rattus norvegicus) | Originally a native of Europe, now found in the valley wherever houses are present. |
| House Mouse (Mus musculus) | Common in houses and, in summer, in nearby fields. |
| Meadow Jumping Mouse (Zapus hudsonius) | Common in suitable habitat. |
| Woodland Jumping Mouse (Napaeozapus insignis) | Common in suitable habitat. |
| Porcupine (Erethizon dorsatum) | Common in 1968. |
| Brush Wolf (Canis latrans) | Reported as common in 1968. |
| Timber Wolf (Canis lupus) | Reported as common in 1968 (Lands & Forests). |
| Red Fox (Vulpes vulpes) | Usually common, now reduced by rabies. |
| Gray Fox (Urocyon cinereoargenteus) | This species, which has the habit of climbing trees, has extended its range into Eastern Ontario from the United States, and probably occurs in the Mississippi area now. |

| | |
|---|---|
| Black Bear (Ursus americanus) | Bears occur but are not common in the Mississippi area. One was seen in Lanark Township during the survey, and one in Pakenham Township. |
| Raccoon (Procyon lotor) | Common. |
| Ermine (Mustela erminea) | Common, particularly in woodlands. |
| Long-tailed Weasel (Mustela frenata) | Common, usually close to water. |
| Mink (Mustela vison) | Found throughout the area, near water. |
| Marten (Martes americana) | 10 were released in S. Canonto Twp. by the Dept. of Lands & Forests in 1954. |
| Fisher (Martes pennanti) | Scarce to absent, as reported by the Dept. of Lands & Forests. |
| Striped Skunk (Mephitis mephitis) | Very common in open areas. |
| Otter (Lutra canadensis) | Relatively common, 19 were sealed at Lanark in 1967. |
| Canada Lynx (Lynx canadensis) | Relatively common, 7 were sealed at Lanark and Stittsville in 1967. |
| Bobcat (Lynx rufus) | Relatively common. |
| White-tailed Deer (Odocoileus virginianus) | Common. Discussed in Volume I of this report. |
| Moose (Alces alces) | Probably a transient in this area. |

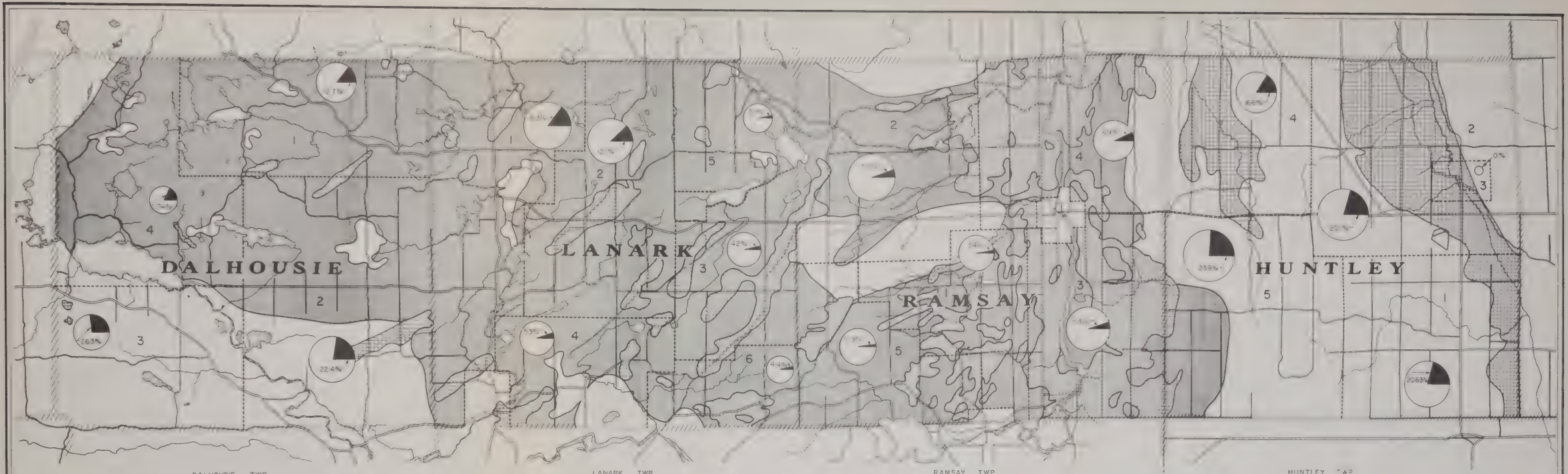
## FERNS OF THE MISSISSIPPI VALLEY

(The following list of Ferns of the Mississippi Valley is based on collections made by Miss E. G. Ross and others in the following townships: Pakenham, Miller, Lavant, Huntley, Fitzroy and Torbolton. The names are from Gray's Manual of Botany VIII Edition).

| | |
|---|---|
| Woodsia ilvensis | Crevices in limestone near waterfall, Pakenham plain. |
| Crystopteris bulbifera | Wet places Pakenham plain, also at Buckshot Lake, Miller Twp. |
| Crystopteris fragilis | Wet places Pakenham plain, also at Buckshot Lake, Miller Twp. |
| Pteretis pennsylvanica | Wet places, common Pakenham plain, also at Buckshot Lake, Miller Twp. |
| Onoclea sensibilis | Wet places, common Pakenham plain, also at Buckshot Lake, Miller Twp. |
| Dryopteris bootii | Along creek bed in Pakenham Twp. in granite hills. |
| Dryopteris cristata | At Buckshot Lake, Miller Twp., and Pakenham in granite hills. |
| Dryopteris disjuncta | Pakenham Village, Pakenham plain. |
| Dryopteris goldiana | Wet places Pakenham plain also at Buckshot Lake, Miller Twp. |
| Dryopteris marginalis | Hillsides, Pakenham Twp., in granite hills. |
| Dryopteris phegopteris | Creek bed Pakenham Village, Pakenham plain. |
| Dryopteris spinulosa var. spinulosa | Hillsides, Pakenham Twp., in granite hills. |
| Dryopteris spinulosa var. intermedia | Hillsides, Pakenham Twp., in granite hills. |
| Dryopteris thelypteris | Hillsides, Pakenham Twp., in granite hills. |
| Dryopteris clintonia | Creek bed, Pakenham Twp., in granite hills. |

| | |
|---|---|
| Dryopteris cristatum | Creek bed, Pakenham Twp., in granite hills and in wet spot, Pakenham hills. |
| Polystichum acrostichoides | On granite hillside a few yards from Robertson Lake, Lavant Twp. |
| Athyrium Filix-femina | Pakenham plain. Wet places and at Buckshot Lake, Miller Twp. |
| Athyrium thelypterioides | Wet places Pakenham plain, also at Buckshot Lake, Miller Twp. |
| Camptosorus rhizophyllus | Huntley Twp. Rocky ledge (limestone). |
| Asplenium trichomanes | Crevices in limestone near waterfall, Pakenham plain. |
| Adiantum pedantum | Common. Pakenham Twp., granite hills. |
| Pteridium aquilinum | Pakenham Twp., Meadows, Lavant Twp., Miller Twp. |
| Polypodium virgianum | Common. Pakenham hills and Lavant hills, granite rocks. |
| Botrychium dissectum var. obliquum | Maple woods, Pakenham Twp. |
| Botrychium dissectum | Beaver meadow in Pakenham Twp., granite hills. |
| Botrychium matricariaefolium | Beaver meadow in Pakenham Twp., granite hills. |
| Botrychium multifidum var. intermedium | Along roadside through hills in Pakenham Twp. |
| Botrychium virginianum | Hillsides Pakenham Twp., and Miller Twp. |
| Ophioglossum vulgatum | Miller Twp., top of rocky ledge in mixed woods. |
| Osmunda Cinnamomea | Maple woods, Pakenham plain, Miller Twp., Lavant Twp. |
| Osmunda claytoniana | Pakenham Twp., Lavant Twp., Miller Twp., along ditches. |
| Osmunda regalis var. spectabilis | Ramsay Twp, in a swale along the Mississippi River, also in Wolves Grove, Ramsay Twp. |
| Cryptogramma stelleri | Near border of Fitzroy and Torbolton Twp. |


ARDA RECREATION LAND
CLASSIFICATION




DALHOUSIE TWP.

| Polling Division | #1 | #2 | #3 | #4 |
|---|---|---|---|---|
| TOTAL ASSESSED FARMLAND | 10,692 acres | 12,584 acres | 7,671 acres | 3,983 acres |
| ASSESSED FARMLAND HELD BY NON-RESIDENTS | 1,362 " | 2,839 " | 2,018 " | 695 " |
| TOTAL AGRICULTURAL CAPABILITY CLASS (1-4) LAND | 517 " | 1,137 " | 127 " | 147 " |
| TOTAL ASSESSED WOODLAND | 4,016 " | 3,605 " | 3,323 " | 7,828 " |
| ASSESSED WOODLAND HELD BY NON-RESIDENTS | 1,116 " | 706 " | 1,410 " | 4,103 " |

LANARK TWP

| Polling Division | #1 | #2 | #3 | #4 | #5 | #6 |
|---|---|---|---|---|---|---|
| TOTAL ASSESSED FARMLAND | 15,056 acres | 12,544 acres | 7,155 acres | 7,600 acres | 4,941 acres | 4,528 acres |
| ASSESSED FARMLAND HELD BY NON-RESIDENTS | 2,297 " | 1,524 " | 300 " | 400 " | 100 " | 200 " |
| TOTAL AGRICULTURAL CAPABILITY CLASS (1-4) LAND | 930 " | 1,780 " | 2,210 " | 820 " | 430 " | 1,150 " |
| TOTAL ASSESSED WOODLAND | 875 " | 1,718 " | 900 " | 703 " | 752 " | 293 " |
| ASSESSED WOODLAND HELD BY NON-RESIDENTS | 200 " | 275 | 0 " | 4 " | 100 " | 0 " |

RAMSAY TWP

| Polling Division | #1 | #2 | #3 | #4 | #5 |
|---|---|---|---|---|---|
| TOTAL ASSESSED FARMLAND | 7,408 acres | 13,954 acres | 11,455 acres | 10,509 acres | 8,625 acres |
| ASSESSED FARMLAND HELD BY NON-RESIDENTS | 250 " | 899 " | 606 " | 735 " | 200 " |
| TOTAL AGRICULTURAL CAPABILITY CLASS (1-4) LAND | 2,490 " | 1,940 " | 9,160 " | 7,430 " | 1,890 " |
| TOTAL ASSESSED WOODLAND | 699 " | 2,499 " | 143 " | 1,848 " | 870 " |
| ASSESSED WOODLAND HELD BY NON-RESIDENTS | 0 " | 260 | 22 " | 225 " | 295 " |

HUNTLEY TWP

| Polling Division | #1 | #2 | #3 | #4 | #5 |
|---|---|---|---|---|---|
| TOTAL ASSESSED FARMLAND | 13,739 acres | 16,066 acres | 556 acres | 10,569 acres | 18,951 acres |
| ASSESSED FARMLAND HELD BY NON-RESIDENTS | 2,835 " | 3,263 " | 0 " | 1,755 " | 4,431 " |
| TOTAL AGRICULTURAL CAPABILITY CLASS (1-4) LAND | 2,336 " | 8,276 " | 870 " | 3,984 " | 562 " |
| TOTAL ASSESSED WOODLAND | 0 | 0 | 0 | 0 | 0 |
| ASSESSED WOODLAND HELD BY NON-RESIDENTS | 0 | 0 | 0 | 0 | 0 |

# DISTRIBUTION OF ASSESSED FARMLAND (1967)
# IN
# DALHOUSIE, LANARK, RAMSAY AND HUNTLEY TOWNSHIPS

LEGEND

AGRICULTURAL CAPABILITY CLASS (1-4) LAND

FOREST CAPABILITY CLASS (1-4) LAND

POLLING DIVISION BOUNDARY ---5---

WHOLE CIRCLE INDICATES TOTAL ACREAGE OF ASSESSED FARMLAND AND HELD BY NON-RESIDENTS

INDICATES TOTAL ACREAGE OF ASSESSED FARMLAND WITHIN A POLLING DIVISION

SCALE

CONSERVATION AUTHORITIES BRANCH, Dept of E&RM 666 9&9

NOTE BLANK AREAS ARE CLASS 5,6 AND 7 LAND SUBMARGINAL FOR AGRICULTURE AND FORESTRY

NOTE ASSESSMENT DATA OBTAINED FROM THE LANARK AND CARLETON COUNTIES ASSESSMENT ROLLS FOR THE YEAR 1967

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FIG. 10 - A1

## SECTION A11

## FOREST RESOURCES AND RELATED ACTIVITY

### 1. Forest Cover Types

The term "Forest Cover Types" refers to those combinations of tree species occupying the ground, with no implication as to whether these types are temporary or permanent. A slightly modified form of this system, drawn up by the Society of American Foresters, was used in the survey of the Mississippi Valley Conservation Authority.

The forest cover of the Authority was surveyed in 1968 by using several sampling methods in which typical blocks of land were studied, or by traversing the more remote areas. Coverage was expanded by using air photo interpretation.

Woodlots considered by their owner as a single entity were divided during survey, where there were clear differences between the type and age class found in them. Conversely, where property boundaries were not marked, as around the borders of bogs, cover types extending across property boundaries were considered as a unit because the species combination and age class remain constant throughout. Generally it can be said that much of the Authority's forest cover on private lands, when examined for its species content alone, exhibits a fragmentation of cover types.

A description of the main cover types in relationship to local site conditions follows.

#### a. Dry Site Types

TYPE 4: Aspen usually functions as a typical pioneer type of forest in southern Ontario, appearing after clear-cutting, overgrazing, or fire. Commonly it invades abandoned fields and pastures. It is sometimes considered a less valuable form of cover, yet it can have many uses. It grows on droughty soils as well as those that are wet throughout a good part of the year, although it avoids the wettest swamps. A sister type, Poplar-Oak (type 4a), is frequently mapped in southern Ontario, occupying similar acreages and sites. Aspen's associates may be largetooth aspen, red cherry, white elm, paper birch and balsam poplar, the latter sometimes forming pure stands on moist sites. An understorey of dogwood or spruce and balsam fir on wet sites, or tolerant hardwoods on drier sites, is frequently present.

Under such conditions, more valuable hardwood species such as basswood can grow successfully at levels of light as low as 13 per cent of full light, although better growth performances will occur between 25 and 45 per cent light levels. White elm will grow well under similar conditions at light levels from 45 per cent of full light upward.

Poplar woodlots, if they have an insufficiently well-stocked secondary component of more useful species, can be used as nurse

crops for higher value coniferous species such as white spruce and white pine, depending on the degree of silvicultural manipulation of the overstorey. These can be planted under the old canopy to the benefit of the stand, although the removal of ground level bracken fern, a common sub-vegetative component of aspen stands, is advocated.

In the case of white pine, this method of stand improvement and replenishment will discourage white pine weevil activity without inhibiting normal height growth of white pine, so long as a level of 55 per cent of normal light intensity can be maintained in the stand. In cases where underbrush occurs in the understorey, some mortality can be expected. Once the pine seedlings grow above this layer, however, mortality will decrease and growth will increase.

Using the poplar overstorey as a nurse crop for white spruce is also a proven method of stand improvement, which requires the removal of up to 60 per cent of the overstorey. This particularly favours spruce which have grown in the aspen to the point where their crowns are immediately below and in direct contact with the aspen crowns.

Under some circumstances, the forest manager may wish to favour commercial aspen culture by increasing this species' suckering ability. This can be done with different treatments such as scarification of the duff layer, bracken fern removal, controlled burning and specialized cutting methods.

Silvicultural methods favouring aspen are used because of its potential in the pulp, paper (newsprint filler, corrugated papers), building board (hardboard and insulation board), and particle board industries. It has the ability to give higher yields of pulp fibre easily, and low density chips which, under pressure, form a compact board with great strength due to improved chip-to-chip bonding *.

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* Logan, K. T. Forestry Research Division, Department of Northern Affairs and National Resources, Technical Notes No. 82, 1952.

Steneker, G. A. Results of a 1936 Regulation Cutting to favour white spruce in a 50-year-old spruce-aspen stand in Manitoba: Forest Research Division, Canada Department of Forestry, Publication No. 1005, 1963.

Steneker, G. A. Growth of White Spruce Following Release from Trembling Aspen: Forestry Branch, Dept. Publication No. 1183, 1967, Canada Dept. of Forestry and Rural Development.

Maini, J. S. and Horton, K. W. Reproductive Response of Populus and Associated Pteridium to Cutting, Burning and Scarification: Forestry Branch, Departmental Publication No. 1155, 1966, Canada Dept. of Forestry and Rural Development.

Logan, K. T. Growth of Tree Seedlings as Affected by Light Intensity: Forestry Branch, Departmental Publication 1176, 1966, Canada Dept. of Forestry and Rural Development.

Market Report, September 1967, Timber Branch, Ontario Dept. of Lands and Forests.

TYPE 4a: Poplar-oak is a residual type on light soils following logging and fire. This type usually consists of trees of white, red and sometimes bur oak, which have survived due to their resistance to fire, and poplar which has seeded in later. The site is usually a white pine site and scattered trees of this species frequently occur, with patches of good white pine reproduction appearing throughout the area.

TYPE 9: White pine, although occupying a prominent economic position in southern Ontario's forest area during the period of early settlement, now commonly occupies a lesser position. There is frequently the problem of low quality stems and poor form in present-day natural stands.

White pine's associates on light soils are red pine, grey birch, black cherry, white ash, red oak, sugar maple, basswood and hemlock. A sister type, white pine-red oak-white ash (type 8), is frequently observed.

White pine is often the first type to occupy abandoned agricultural land, a characteristic worthy of special interest on the part of property owners in the Authority. It approaches permanence on sandy soils. On heavier soils it is usually succeeded by sugar maple-beech-yellow birch, red oak-basswood-white ash, and white spruce-balsam fir-paper birch. It is considered to be a long-lived, temporary type that seldom succeeds itself except after fires or under special cultural treatment.

TYPE 14: Sugar maple, and its related type 57, beech-sugar maple, are commonly observed occupying locations in heavily developed agricultural areas. Both types favour deep, fertile, well-drained soils with good moisture conditions. At times sugar maple stands may have a small proportion of yellow birch, white ash, red and white oak. They sometimes owe their vigour to cultural practices favouring maple syrup production and may also be found in small patches.

Both types have commonly experienced considerable cutting and clearing pressure since settlement.

TYPE 13: Sugar maple-basswood is another cover type that appears on rich upland loamy soils, hence has also experienced heavy clearing pressure in favour of agriculture. It appears frequently on lakeshores. Along with the predominant species, white elm, yellow birch, white pine and red oak, are to be found as associates.

The following minor forms of forest cover are common on dry sites in the Authority.

TYPE 10: White pine-hemlock commonly occurs in small scattered stands with these two species predominant but with many minor associate species. The principal ones are beech, sugar maple, basswood, red maple, yellow birch, black cherry, white ash, paper birch, northern red oak and white oak. Occasionally this type

is the result of long continuous grazing of farm woods containing scattered pine and hemlock in mixture with hardwoods.

TYPE 11: Hemlock grows in small stands where its associates are similar to those in type 10. As a cover type it frequently associates with northern hardwood stands.

TYPE 45: Bur oak generally occurs in small localized stands only. It tends towards dry, exposed sites of sandy plains or loamy slopes. In northern climates, its associate species include northern red oak, white oak and ironwood.

TYPE 49: White oak-black oak-red oak, a variant of another type (type 52) white oak-red oak-hickory, occurs on a wide variety of well-drained upland soils. Stands of this type cover small areas only.

TYPE 50: White oak is commonly found on dry upland sites in small stands with white oak predominant over such associate species as red oak, bur oak, shagbark and bitternut hickory, white ash and largetooth aspen.

TYPE 51: Red oak-basswood-white ash as a cover type is usually observed on deep, fertile, moist, well-drained soils. Its common associate species are red maple, yellow birch, the aspens, sugar maple, paper birch, and beech.

TYPE 52: Red oak commonly covers small acreages, tending to act as a pioneer species in Canada on warm dry sites. This may frequently happen in association with paper birch.

TYPE 59: Ash-hickory is a cover type found throughout the deciduous forest area on poorly-drained soils. It may occur on any cut-over area. The predominant species are white ash, hickory and white elm. It is not uncommon to observe stands with heavy components of either white ash or hickory.

b. Wet Site Types

TYPE 24: White cedar is a cover type that occurs on the muck soils of swamps where drainage is slow, but it avoids strongly acid swamps or stagnant bogs. Under these conditions its common associates are black ash, white elm, tamarack, red maple, yellow birch, hemlock, white pine and white birch. It is a characteristic type on seepage areas.

Where lime is plentiful, white cedar extends to droughty upland slopes, where it tends to form pure stands. It also occurs on the shallow soils of limestone plains. All of these conditions are quite typical of the Authority.

TYPE 26: Black ash-white elm-red maple occurs on moist to wet muck and peat soils, and is found in swamps, gullies, and

small depressions of slow drainage, or in elongated areas along small sluggish streams. It frequently grades into white cedar on wetter sites. Black ash is considered to be the indicator species of the type.

Associate species are balsam poplar, balsam fir, yellow birch and, less commonly, white pine, tamarack, white cedar and basswood.

TYPE 60: Silver maple-white elm and its closely related type 60a, white elm, occur on stream bottoms and on swampy depressions where the land is too wet for agriculture, unless underdrained.

During the 1968 survey, the following variations of cover types were also observed.

A: Red maple locally tends to occupy a remnant position in areas where it may be the survivor of former stands of which it was a component.

B: White spruce may consist locally of remnant patches left after logging and grazing on limestone plain areas, in which a few large spruce occur as an open stand overstorey for more densely populated younger stands of such species as white cedar and balsam fir.

C: Black ash is found mainly in the form of young stands in swamps, sometimes pure and sometimes the predominant species with elm and silver maple.

The main forest cover types in the Authority in order of frequency and area are as follows:

1. Aspen
2. Poplar-oak
3. White pine
4. Sugar maple-basswood
5. Sugar maple
6. White spruce-balsam fir-paper birch
7. White cedar
8. Black ash-white elm-red maple
9. Silver maple-white elm
10. White elm

Sixteen other cover types occupy small acreages. These are:

1. Paper birch
2. White pine-red oak-white ash
3. White pine-hemlock
4. Hemlock
5. Sugar maple-beech-yellow birch
6. Tamarack
7. Red maple
8. Red oak-basswood-white ash
9. Red oak
10. Beech-sugar maple
11. Beech
12. Ash-hickory
13. Willow
14. White spruce
15. Black ash
16. White oak

# FOREST COVER TYPES BY TOWNSHIPS

## PRINCIPAL SETTLED AREAS

(BASED ON LIMITED SAMPLES)

FIG 11-A1

WOODLAND CONDITIONS BY TOWNSHIPS

PRINCIPAL SETTLED AREAS

(BASED ON LIMITED SAMPLES)

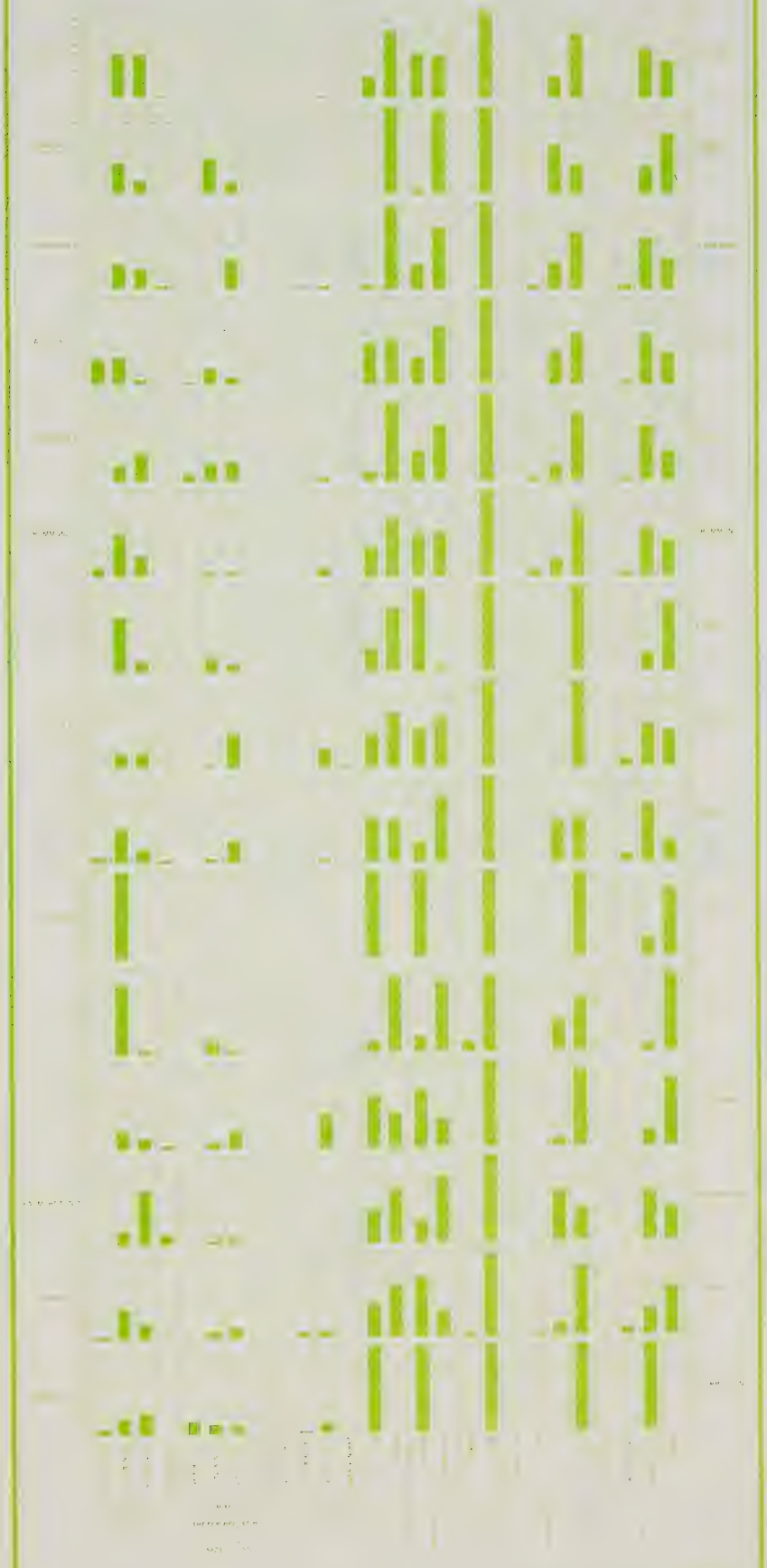


FIG. II. A2

# FOREST COVER TYPES BY TOWNSHIPS

## LIGHTLY SETTLED AREAS

(BASED ON LIMITED SAMPLES)


FIG. II-A3

MISSISSIPPI VALLEY CONSERVATION AUTHORITIES BRANCH, Dept. E.S.R.D., M.V.C. 1959

# WOODLAND CONDITIONS BY TOWNSHIPS

## LIGHTLY SETTLED AREAS

(BASED ON LIMITED SAMPLES)

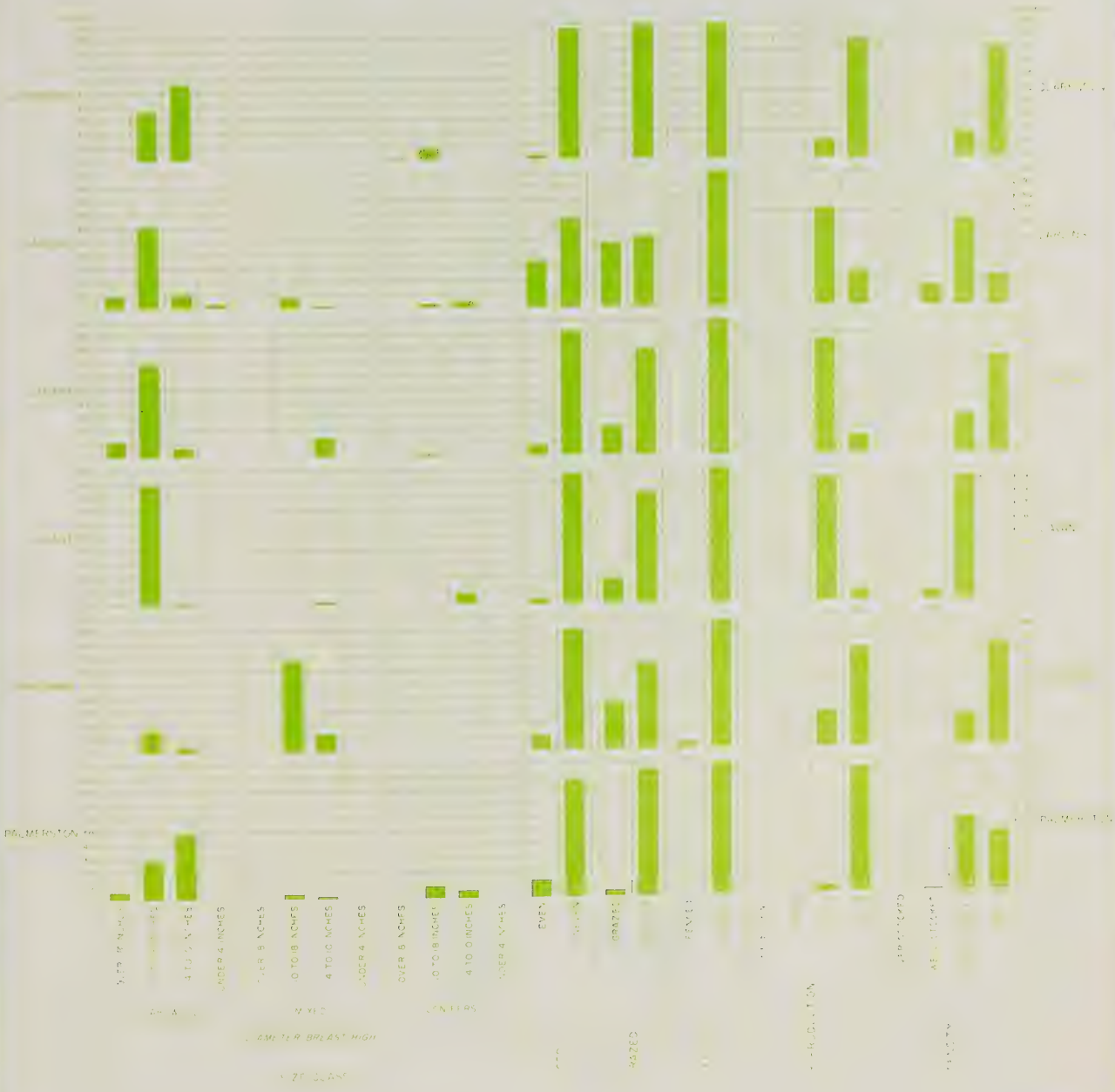


FIG. 11-A4

# FOREST COVER TYPES BY TOWNSHIPS

## REMOTE AREAS

(BASED ON LIMITED SAMPLES)


FIG. 11-A5

MISSISSIPPI VALLEY - CONSERVATION AUTHORITIES BRANCH, Dept E. & R.M., W.J.C. 1969

# WOODLAND CONDITIONS BY TOWNSHIPS

## REMOTE AREAS

(BASED ON LIMITED SAMPLES)


FIG. II-A6

MISSISSIPPI VALLEY - CONSERVATION AUTHORITIES BRANCH, Dept. E. & R.M., W.J.C. 1969

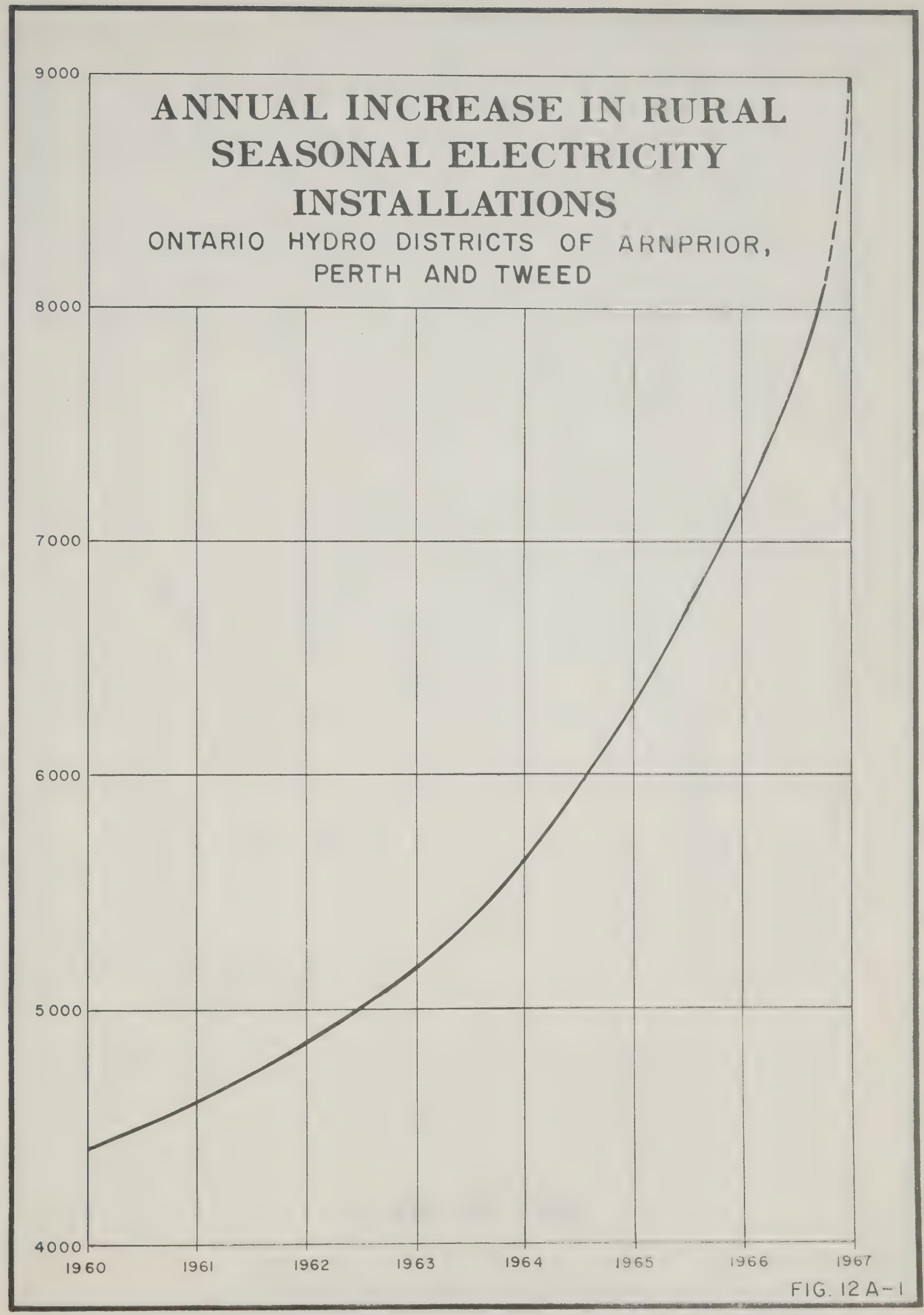
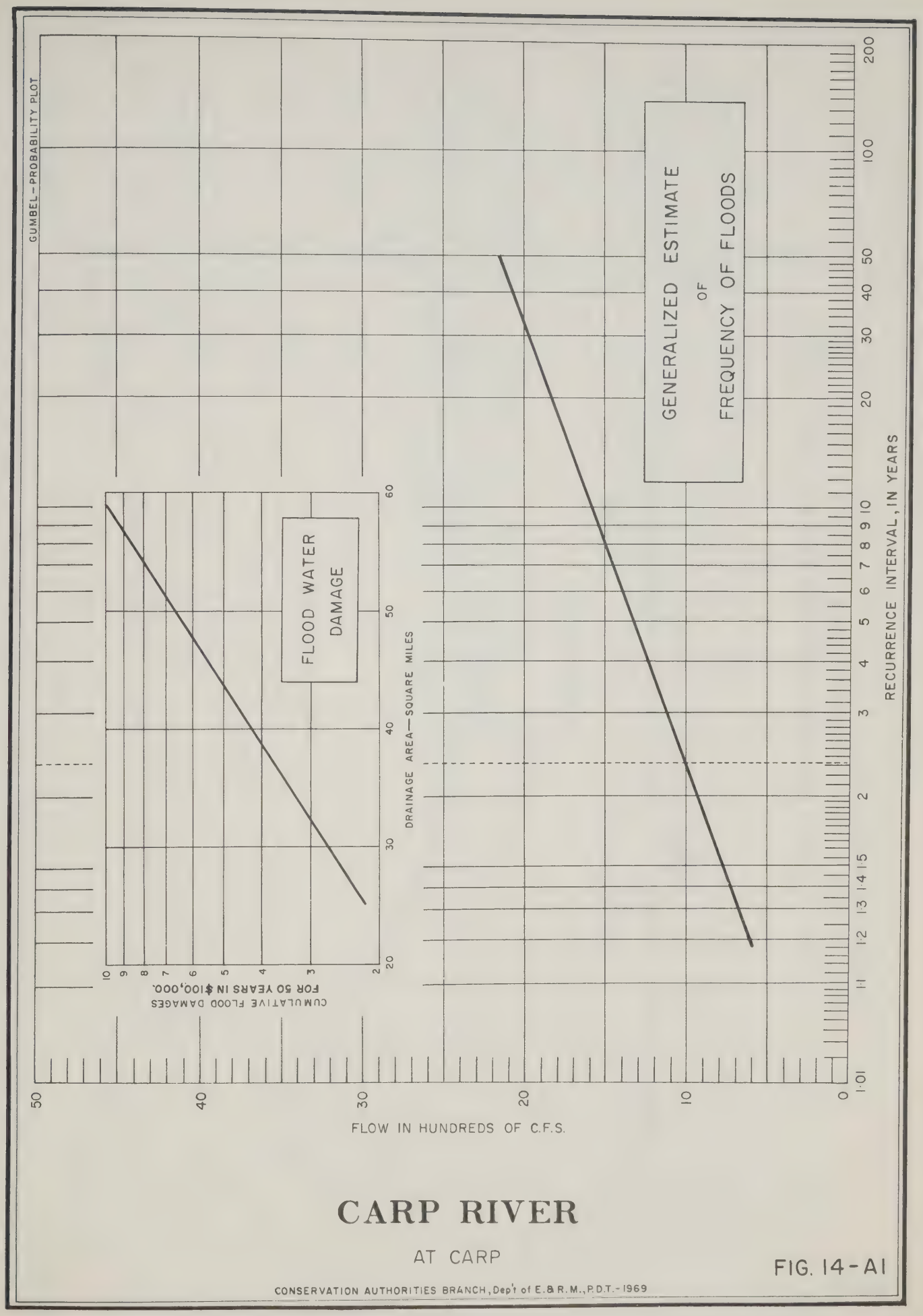

ANNUAL INCREASE IN RURAL SEASONAL ELECTRICITY INSTALLATIONS
ONTARIO HYDRO DISTRICTS OF ARNPRIOR, PERTH AND TWEED
9000
8000
7000
6000
5000
4000
1960
1961
1962
1963
1964
1965
1966
1967

FIG. 12 A-1

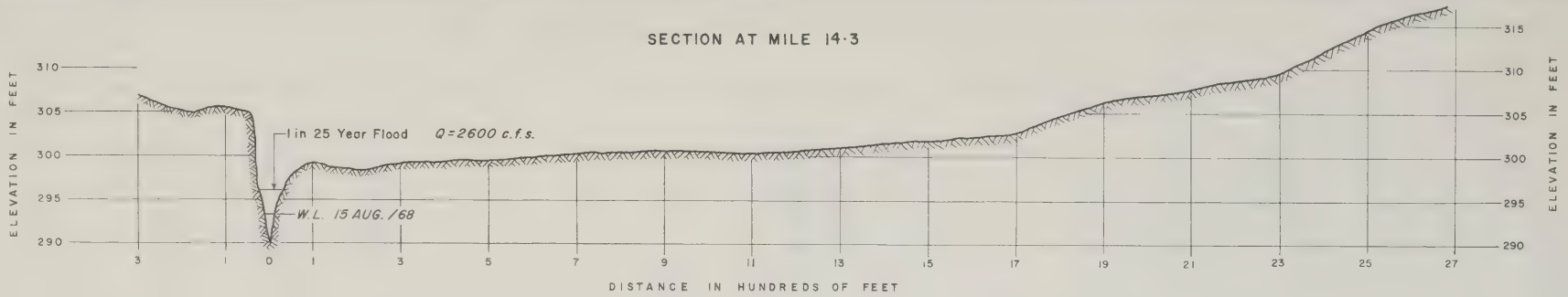


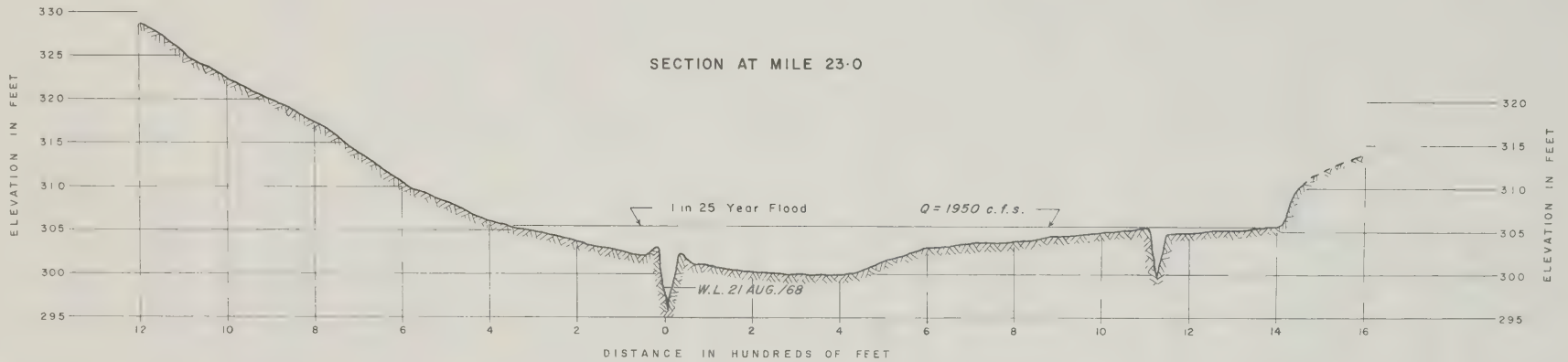

# CARP RIVER

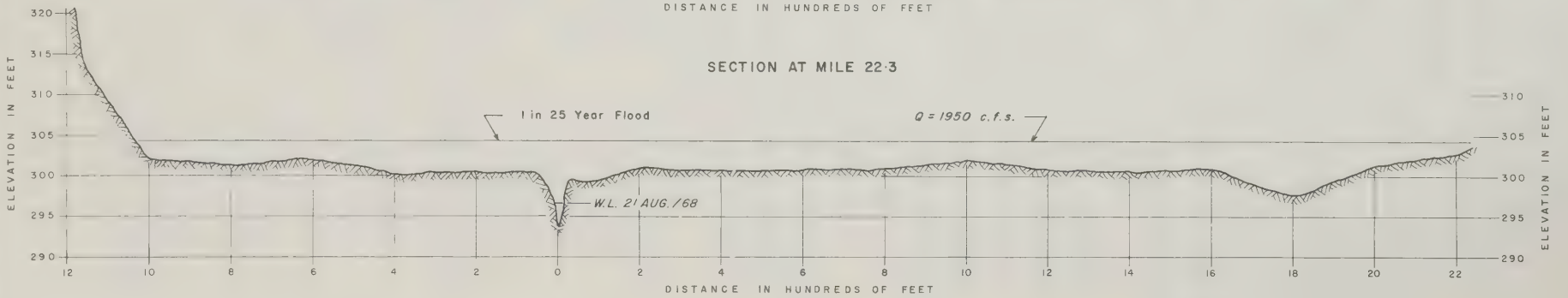
AT CARP

FIG. 14-A1

CONSERVATION AUTHORITIES BRANCH, Dep't of E.& R.M., P.D.T.-1969




# TYPICAL CROSS-SECTIONS OF CARP RIVER FLOOD PLAIN

( LOOKING UPSTREAM )

SECTIONS PLOTTED FROM FIELD SURVEY NOTES – G.S.C. DATUM — MILEAGE MEASURED UPSTREAM FROM OTTAWA RIVER

FIG. 14–A2

CONSERVATION AUTHORITIES BRANCH DEPT. E. & R. M. W. G. M. 1969

## SECTION A15

## EROSION DAMAGE

TABLE A15-1

LOCATIONS OF SIGNIFICANT STREAMBANK EROSION FEATURES

| Stream or River | Location | Erosional Feature |
|---|---|---|
| Carp River | Lot 6, Con. 8, Fitzroy Twp. | Cattle damage and gullying |
| | Lot 3, Con. 8, Fitzroy Twp. | Cattle damage and bank erosion |
| | Lot 26, Con. 4, Huntley Twp. | Cattle damage |
| | Lot 21, Con. 3, Huntley Twp. | Cattle damage |
| | Lot 19, Con. 3, Huntley Twp. | Bank erosion |
| | Lot 17, Con. 2, Huntley Twp. | Cattle damage |
| | Lot 7, Con. 1, Huntley Twp. | Cattle damage and slumping |
| Mississippi River | Lot 18, Con. 5, Fitzroy Twp. | Slumping |
| | Lot 15, Con. 2, Fitzroy Twp. | Cattle damage and gullying |
| | Lot 6, Con. 10, Pakenham Twp. | Cattle damage |
| | Lot 4, Con. 10, Pakenham Twp. | Bank erosion |
| | Lot 2, Con. 9, Pakenham Twp. | Gullying |
| | Lot 24, Con. 9, Ramsay Twp. | Terracing by livestock |
| | Lot 22, Con. 9, Ramsay Twp. | Cattle damage and gullying |
| | Lot 13, Con. 10, Ramsay Twp. | Bank erosion |
| | Lot 6, Con. 9, Ramsay Twp. | Cattle damage |
| | Lot 20, Con. 12, Ramsay Twp. | Cattle damage |
| Indian River | Lot 24, Con. 7, Ramsay Twp. | Cattle damage |
| | Lot 22, Con. 6, Ramsay Twp. | Cattle damage |
| Indian Creek | Lot 7, Con. 9 & 10, Pakenham Twp. | Slumping |
| | Lot 7, Con. 9, Pakenham Twp. | Cattle damage and bank erosion |
| Cody Creek | Lot 20, Con. 10, Huntley Twp. | Cattle damage, slumping and undercutting |
| | Lot 23, Con. 11, Huntley Twp. | Cattle damage, bank erosion and gullying |

Table Continued

TABLE A15-1, Locations of Significant Streambank Erosion Features, Continued

| Stream or River | Location | Erosional Feature |
|---|---|---|
| Cody Creek, cont'd. | Lot 9, Con. 1, Fitzroy Twp. | Erosion and terracing by cattle |
| A Tributary to Cody Creek | Lot 11, Con. 1, Fitzroy Twp.<br>Lot 10, Con. 2, Fitzroy Twp. | Cattle damage<br>Bank erosion |
| Constance Creek | Lot 7, Con. 3, Torbolton Twp. | Cattle damage, slumping, silting |
| | Lot 26, Con. 2, March Twp. | Slumping |
| | Lot 25, Con. 2, March Twp. | Cattle damage, slumping and gullying |

3. Erosion Damage in Forested Areas and Farm Woodlots

a. Sheet Erosion

Local beef livestock enterprises inevitably lead to the spread of cattle into forest areas, as natural meadow grasses are pastured to a state of short supply early in the season. Generally speaking this method of livestock husbandry has been proven injurious to the landscape and of little practical use to the livestock as feed. From this latter point of view alone, local farmers should cease their deliberate use of woodlands for pastures, since the actual food value of woodland vegetation and tree seedlings has been proven through research to be extremely limited. Additionally, cattle prefer those species that are the most useful for high quality wood products, such as sugar maple, white ash, basswood, white pine, white spruce, and white cedar, since they are more succulent, leaving the less desirable species to form an increased proportion of the stand. This affects both the present owner and his heirs, since the woodlot's growth period is normally longer than one person's life span.

Woodland grazing affects more than the growth of trees. Soil erosion in the woodland increases as the absorptive capacity and mechanical protection afforded the soil by the litter are reduced. The open canopy exposes the soil and the erosive force of rain on compacted soil forces overland movement of water. Livestock tend to follow trails in the woodland and these often become centres of serious erosion. Thus continued grazing increases surface runoff and soil erosion. During studies of watershed management problems at the Coweeta Hydrologic Laboratory at Ashville, North Carolina, in 1952, some interesting facets of this problem were observed*.

---

* Johnson, E. A. Effect of Farm Woodland Grazing on Watershed Values in the Southern Applachian Mountains. Journal of Forestry, Volume 52, No. 6, June 1954.

To begin with, it was found that continued woodlot grazing will eventually give a forest stand a park-like appearance with no ground cover and the effect of an empty space between the ground and the first limb layer that grazing cattle cannot reach.

With fewer stems offering the obstruction to movement, the litter is blown away to accumulate in ravines and ungrazed patches of sub-vegetation.

The porosity and permeability of soil are reduced as well as infiltration, so that increased overland storm runoff produces sheet erosion which increases progressively.

During the early years of woodlot grazing silt may not reach permanent streamflow channels because it is caught by the litter in depressions and ravines, allowing water to eventually percolate into the soil.

However, during the Coweeta experiments, a high intensity storm in the ninth year of experimentation produced large volumes of overland flow that scoured out the litter dams and carried eroded sediment directly to the stream channels, causing a subsequent jump in stream turbidity. Eventually a continuous strip of bare soil developed from the storm-runoff source-areas to the permanent stream channel.

These observations indicated that if downstream municipalities needed this water derived from grazed watershed areas, filtration treatment would be needed to make it usable. Under the conditions of these experiments, it was indicated that one acre of improved pasture would provide more cow-days of grazing than 100 acres of woodland, and that the woodlot grazing did not cause the livestock to thrive, nor was there sufficient profit to balance against the expensive land damage.

b. Logging and Erosion

Research into logging road construction, particularly that which originated in West Virginia*, has been directly related to watershed management in areas of shallow soils over bedrock. Simple changes in traditional road location methods were the result, and these are almost universally applicable in forest management.

---

* (1) K. G. Reinhart, A. R. Eschner, G. R. Trimble, Jr. Effect on Streamflow of Four Forest Practices in the Mountains of West Virginia; U.S. Forest Service Research Paper NI-1 1963, North-eastern Forest Experiment Station, Upper Darby, P.A. Forest Service, U. S. Department of Agriculture.

(2) Richard F. Houseman. Permanent Logging Roads for Better Woodlot Management; Division of State and Private Forestry, Forest Service, Eastern Region, U. S. Department of Agriculture, Upper Darby, Pennsylvania.

Points to be remembered are:

i. The maintenance of 20 per cent grade limits in climbing access road construction;

ii. Roads should cross hillsides rather than leading directly down them;

iii. Draws forming parts of the drainage system should not be used for skid roads;

iv. Steep slopes close to streams should be left untouched for varying distances from the streams; see Table A15-2 below;

v. Switchbacks between roads located along steep slopes should be at least 35 feet in diameter to allow for easy vehicle negotiation;

vi. Secondary skid roads may be necessary to extract timber from areas halfway between the main skid roads. These are best kept at about a four per cent grade to keep roads properly drained without damage. Flattened roads along contours, particularly rough skid roads, tend to accumulate puddles that can increase the erosion problem.

vii. Water bars should be placed at regular intervals along main skid roads and cross-hill haulroads. Their outlet ends should be rip-rapped and the downhill road banks should be left covered with their natural tree and shrub vegetation. Water bars should be placed at a slight angle to the road to make water passage easy, but these water bars should be dug in deep enough in order to prevent water from running underneath them.

viii. It is wise to grass roadways and yarding areas when logging operations are complete.

Table A15-2 shows suggested widths of "buffer" or filter strips between roads and streams.

TABLE A15-2

RECOMMENDED WIDTHS FOR FILTER STRIPS BETWEEN LOGGING ROADS AND STREAMS

| Slope of Land Between Road and Stream (Per cent) | Width of Filtration Strip (Feet) |
|---|---|
| 0 | 25 |
| 10 | 25 |
| 20 | 65 |
| 30 | 85 |
| 40 | 105 |
| 50 | 120 |
| 60 | 145 |
| 70 | 165 |

## SECTION A17

## INADEQUATE LOCAL DRAINAGE

Areas where the installation of sub-surface drainage systems would provide local benefit can be located from county soil reports and maps with some general support from the mapping work of the Canada Land Inventory covering soil capabilities for agriculture. Most of these lands remain saturated after spring flooding, thus limiting their agricultural productivity.

Examination of these reports indicated that problem areas appear in the following regions:

a. The main valley of the Carp River;

b. Portions of the main valley of Cody Creek;

c. The Galetta area;

d. The Carp River Valley south of Fitzroy Harbour;

e. The area of Constance Bay — MacLaren Landing;

f. The area between Woodlawn, Dunrobin and south of Dunrobin;

g. An area between Harwood Plains and South March;

h. An area in the north-east corner of Lanark County, north of Pakenham;

i. An area west of Carleton Place;

j. The general region west of the Mississippi River between Mississippi Lake and Pakenham; and

k. The general region of Haley Lake, Mississippi Lake, the village of Balderson and south-west of Balderson to the Authority boundary.

Although the total area of soils with a variety of drainage problems, exclusive of areas of peat and muck, totals between 76,000 and 77,000 acres, the major potential problem area lies in the valley of the Carp River. This region covers over 46,000 acres, generally in one long unbroken narrow strip, between Kinburn and the headwater reaches. Previous soil studies have indicated that the actual problem area represents 25 per cent of this acreage and occupies a corridor that is generally adjacent to the river itself. The other areas are mainly in the Carleton County portion of the Authority and occupy lesser areas in individual blocks of irregular shape.

In Lanark County the regions exhibiting soil drainage problems have a a different character. With the exception of the regions north of Pakenham and east of Carleton Place, all of the poorly drained soil deposits are much

smaller, fragmented in distribution and again irregular in shape. Generally, they are sufficiently fragmented that they cannot fit the present property pattern.

The pertinent soils can be listed.

1. The Rideau clay soil series
2. Renfrew clay
3. The Bearbrook clay soil series
4. Elwood clay loam
5. Farmington clay loam
6. Carp clay loam
7. The North Gower soil series
8. Osgoode loam
9. Lyons loam
10. Manotick sandy loam
11. The Allendale soil series
12. Balderson sandy loam
13. Brook sandy loam
14. Franktown sandy loam
15. Granby sandy loam
16. Innisville sandy loam
17. Lanark clay loam
18. Matilda loam
19. Rubicon sandy loam
20. Wayside sandy loam
21. Wemyss sandy loam

A group of presently installed tile systems was examined to determine outlet conditions. Although these systems are not large in number, certain trends in their maintenance can be observed.

Only half of these systems possess end grates on the outlet pipe to protect them from debris. At the moment, erosion around or at the outlet is not a major problem although only 35 per cent of the outlet areas examined have been maintained with rock rip-rap or vegetation to preserve slope stability below outlet pipes. Silting has occurred at just under one-third of the outlet sites and is generally closely related to adjacent clay soils, particularly in Fitzroy Township and in one case in Pakenham Township. These latter two observations indicate a need for greater care in outlet and outlet area maintenance on the part of the individual property owner.

SECTION A19

WATER POLLUTION

3. Sources

d. Cheese Factories Examined

i. Balderson (Drummond Township)

At this cheese factory the whey is deposited, in winter at least, in a lagoon in Concession VII, east of the Lanark-Perth Road. The survey party was told that in summer the whey is spread on land as fertilizer or sold as feed for hogs. There was evidence at the lagoon that some of the whey had been poured down the outside of the lagoon into a swamp which has water in it. This cheese factory was revisited an hour later and it was found that a truckload of whey was being dumped into a ditch or watercourse about half a mile north of Balderson.

ii. Kinburn (Fitzroy Township)

Along the Carp River at Kinburn in Fitzroy Township there was an area of gross pollution from a cheese factory. The owner had installed a septic tank system, but there was a leak of polluted effluent entering the river.

iii. Boyd Settlement (Lanark Township)

At this cheese factory the owner was reported to be selling whey to a farmer and no signs of pollution were found.

iv. McCreary (Ramsay Township)

At this cheese factory it was reported the factory dumped whey into a stretch of woodland behind the factory. No gross signs of pollution were found.

SECTION A21

NEEDS AND REMEDIAL MEASURES

2. Flood Prevention and Water Conservation

d. Farm Ponds

There are four major types of ponds, which can be roughly classified according to the source of water supply, as follows:

i. Dug-out Ponds (see illustrations)

These ponds are formed by excavating in a depression where the water table is high. Their main water supply is from ground water but they may also receive some surface runoff.

This type of pond is cheap to construct and requires no designed outlet. However, with no flow through the pond, the water tends to become stagnant after some time and unless the pond is very large, it is not suitable for the keeping of fish. Such a pond depends on a high water table and if the water level falls below the bottom of the pond it will dry up.

ii. Spring-fed or Runoff Ponds

These ponds are supplemented by water from a spring or from intermittent runoff from a small, well-defined watershed. Ideally they are located at outlets of small valleys or at the foot of a rise from which springs issue. Water can be stored by constructing an earth dam or by a combination of excavation and diking. For constant supply of water passing into the pond it is necessary to have a mechanical spillway as well as some sort of grassed waterway or emergency spillway to prevent damage from excessive overflow.

iii. By-Pass Ponds

These ponds are constructed adjacent to a stream. The level is maintained by diverting water through a pipe or ditch from the stream to the pond. Excess water is allowed to return to the stream after passing through the pond. This has the advantage of a flow of fresh water without interfering with the natural flow of the stream. During spring runoffs or periods of high flow, the water is allowed to go down the original channel and thus damage to the pond by excessive flow or silting is minimized.

iv. Stream Impoundments

Water may be impounded by a permanent structure across a watercourse or by a temporary structure placed

only after the spring freshet, to maintain a summer pool. The temporary structure can be taken out at periods of high summer flow.

The design and construction of ponds of this type will usually necessitate careful design and planning and can be more costly. Such ponds are therefore usually maintained as community projects rather than as farm ponds.

4. Water Quality Control

ALTERNATIVE USES OF WHEY: The following paragraphs concerning research on the use of whey are quoted from the 1967 study by the Ontario Department of Agriculture and Food (page 36)*.

"Much scope exists for further research work on whey products in Canada. A survey of dairy research found very few projects on whey currently in progress. A variety of new whey products have been developed in Europe recently (for example, vinegar and beverages), and their application to our particular circumstances in Ontario may warrant investigation.

"Considerable research has been done in the United States on the use of whey as an ingredient in the bakery industry, the frozen food industry, the dehydrated foods industry, and related fields. An example of the growing commercial interest in whey processing in the United States is the fact that the U.S.A. had 90 processing plants for whey in 1964 and this number increased to 100 plants in 1965.

"There is little doubt that further research is warranted, not only on the production aspects of whey, but also on their marketing potential, including consumer acceptance.

"In addition to the domestic market for whey products, there may be a possibility of using whey in a food-aid program for underdeveloped countries.

"In instances where there have been procedures already established for publicly supported research, a whey product research program may be useful in transforming the unused portion of this product into an item of economic value."

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* The Economics of Alternative Methods of Whey Disposal at Southern Ontario Cheese Factories, Ontario Department of Agriculture and Food, September, 1967.

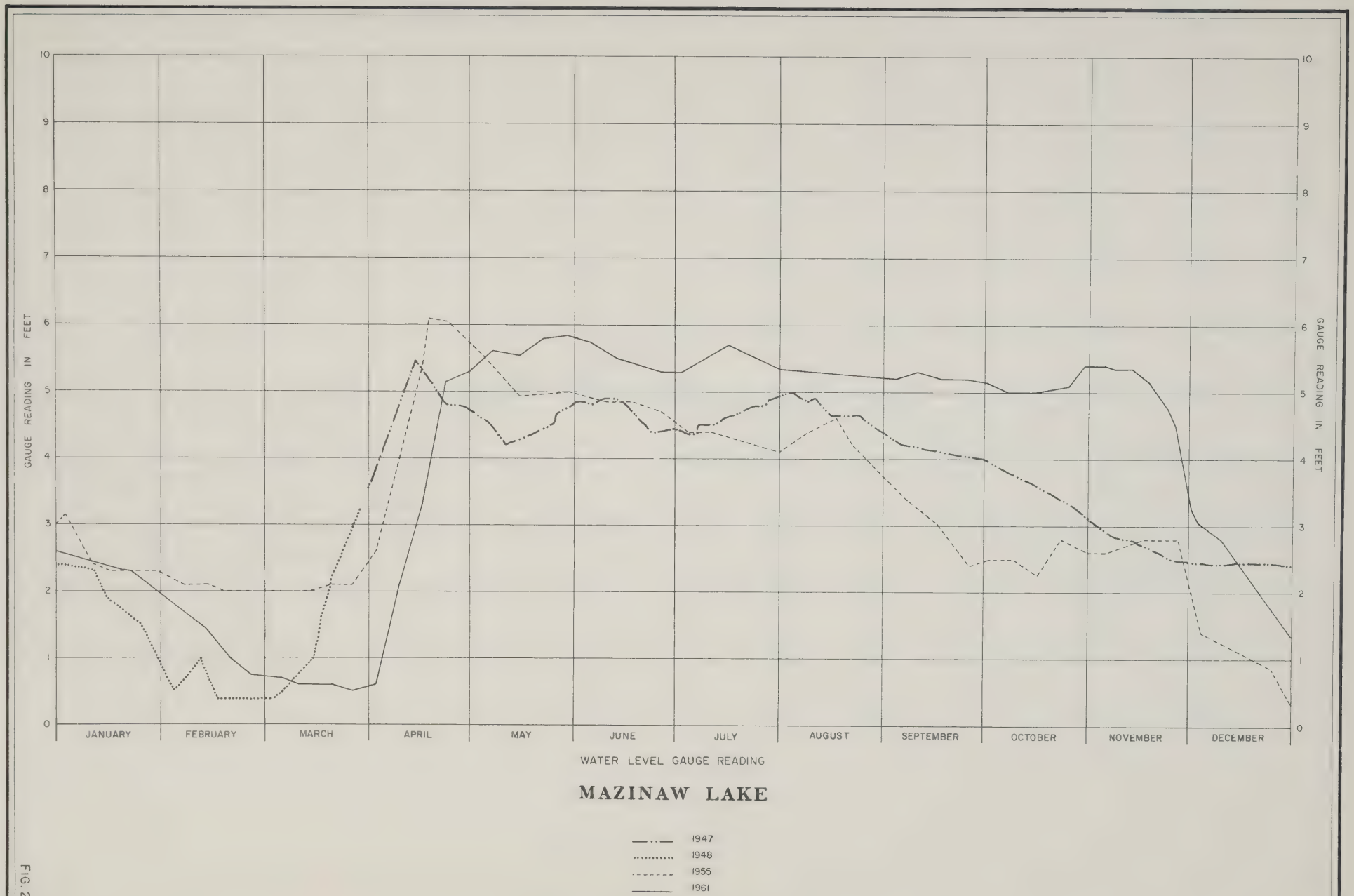
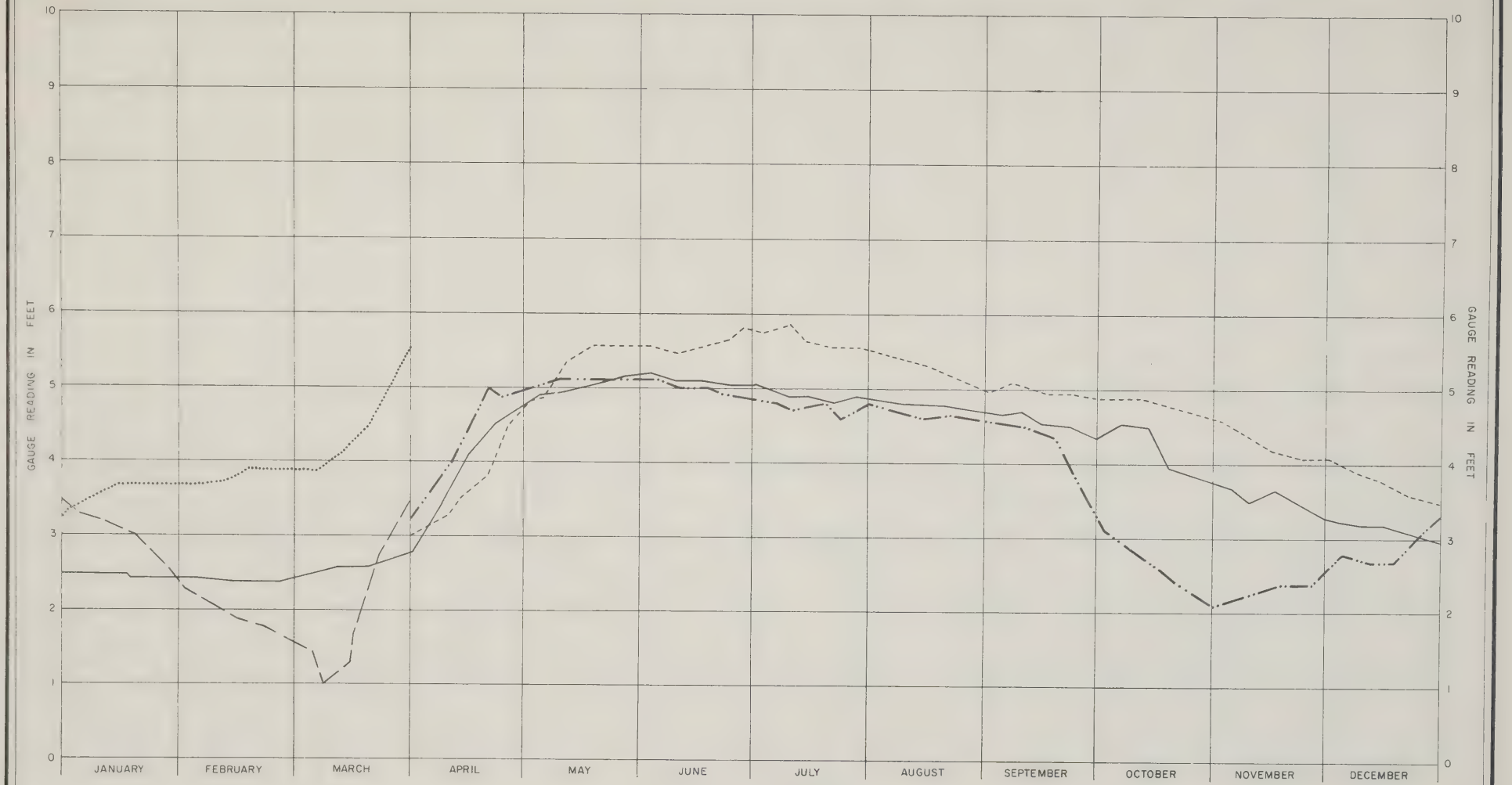



FIG. 21-A1

CONSERVATION AUTHORITIES BRANCH, Dept. of E. & R.M., OCT 1969




WATER LEVEL GAUGE READING

## CLARENDON LAKE

1941
1942
1944
1945
1962

FIG. 21-A2

CONSERVATION AUTHORITIES BRANCH, Dep't. of E. & R.M., O.D.T. 1969

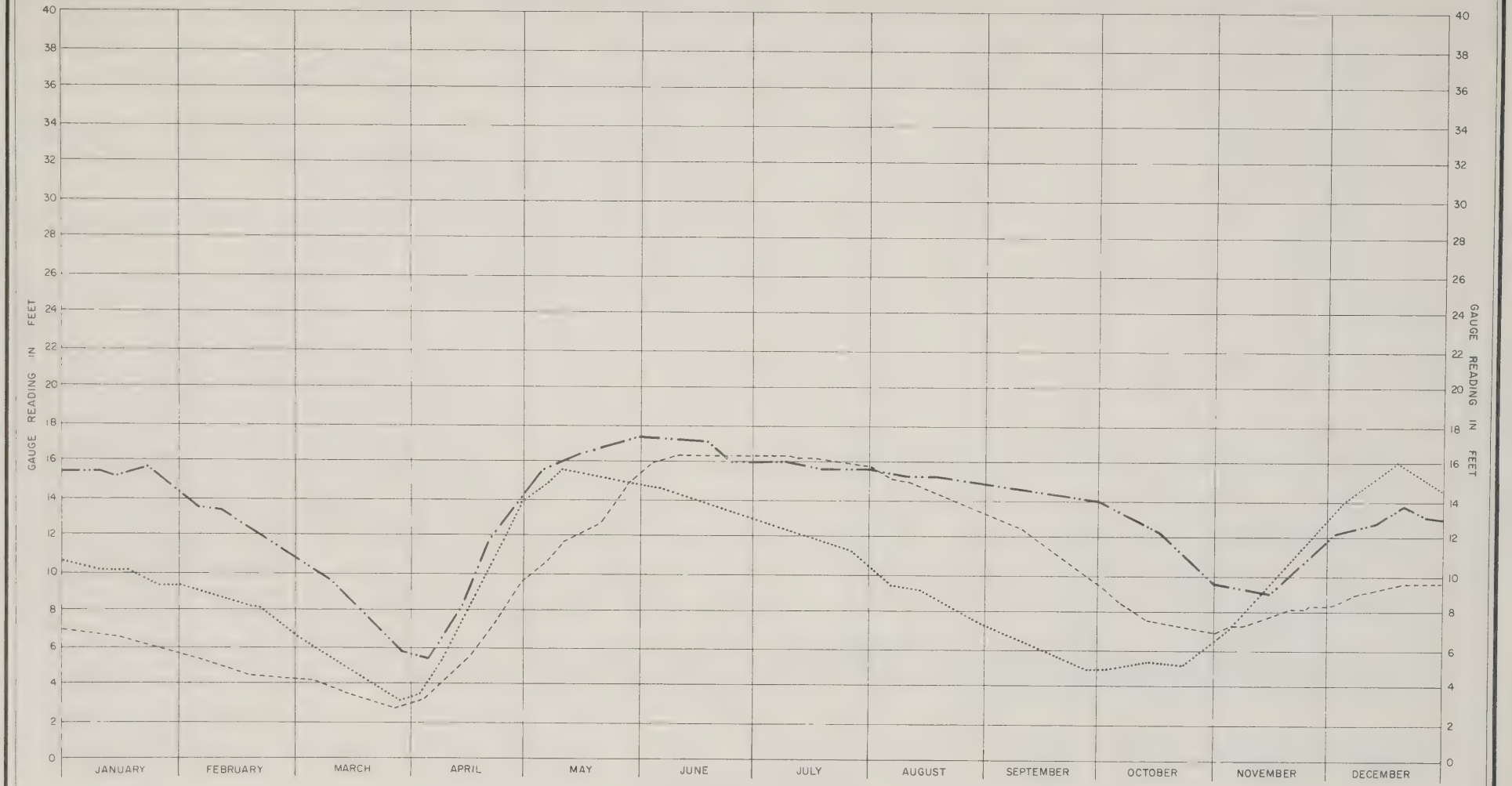
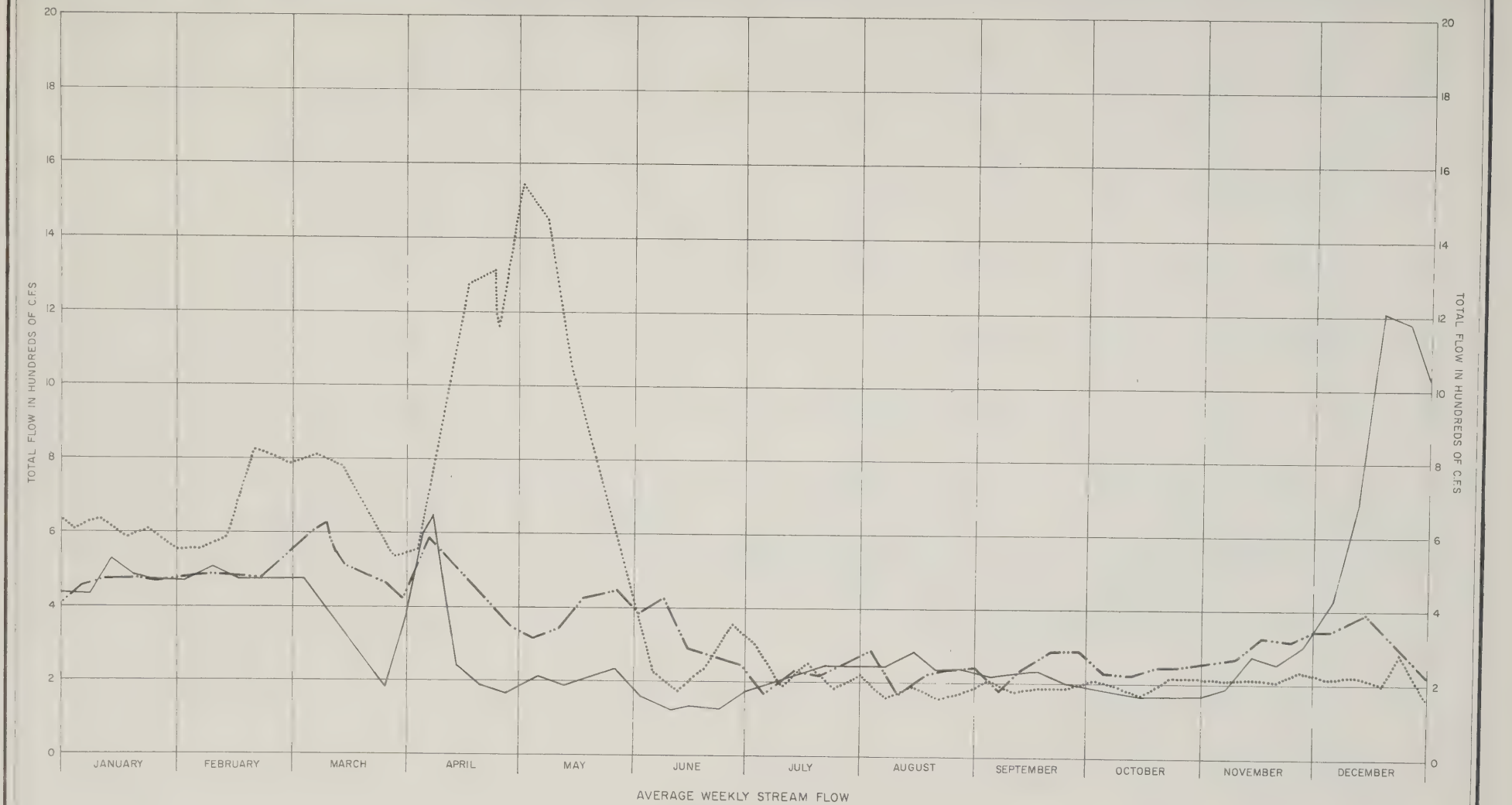



FIG 21-A3

CONSERVATION AUTHORITIES BRANCH, Dep't. of E. & R.M., P.D.T 1969




## HIGH FALLS GENERATING STATION

1958
1960
1963

FIG. 21-A4

CONSERVATION AUTHORITIES BRANCH, Dept of E. & R.M., PDT. 1969

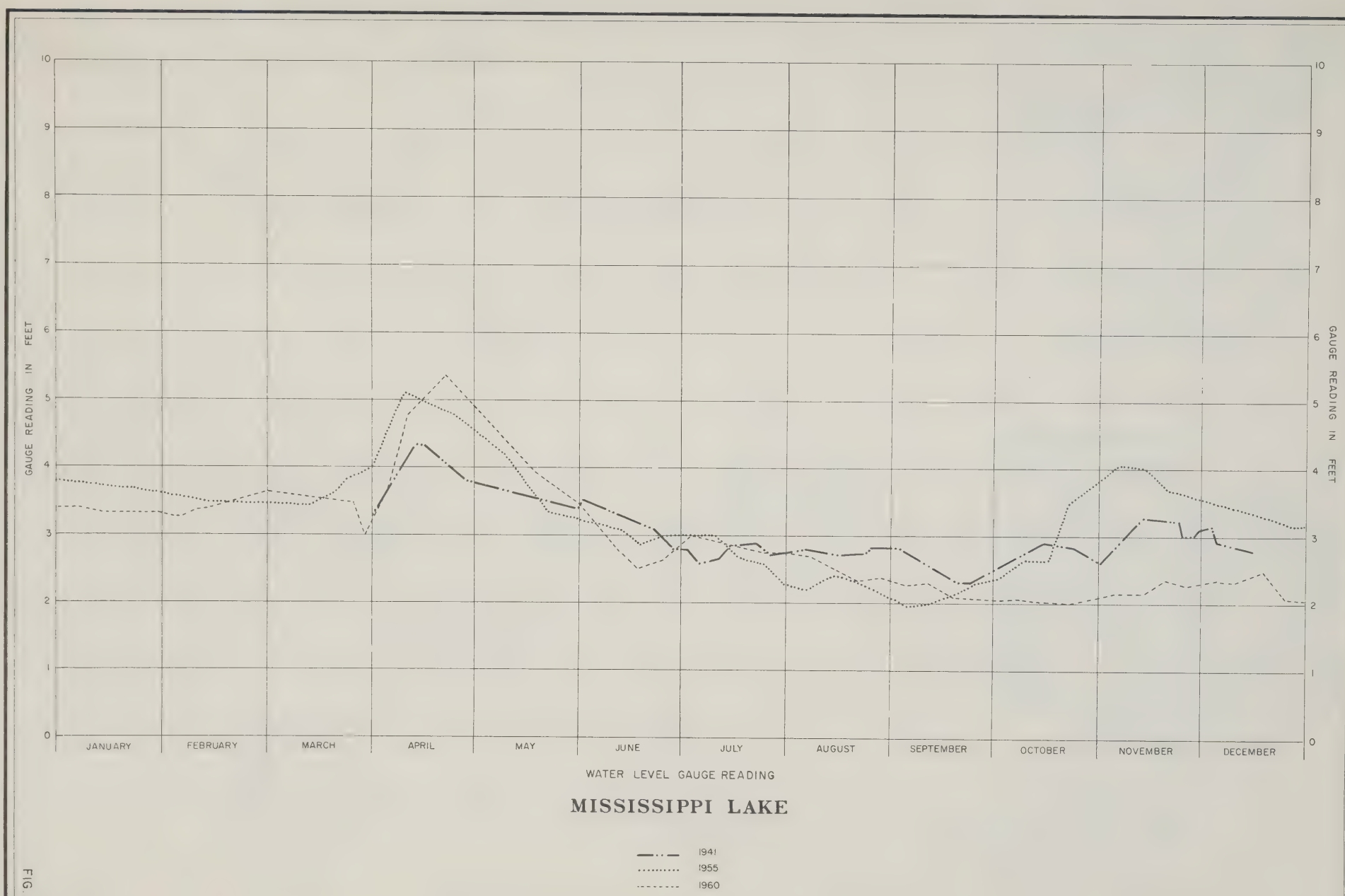
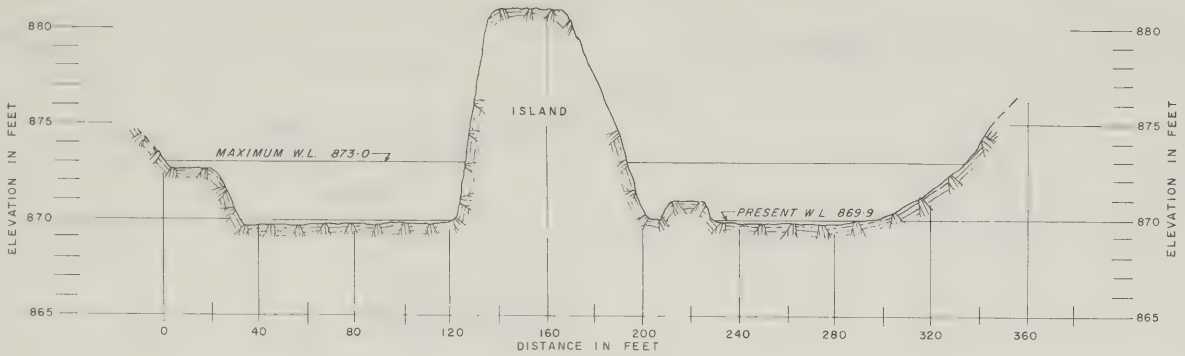



FIG. 21-A5

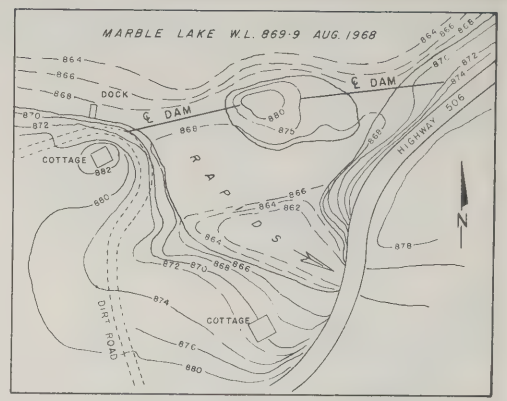
CONSERVATION AUTHORITIES BRANCH, Dept of E & R M, PDT 1969




DAMLINE PROFILE

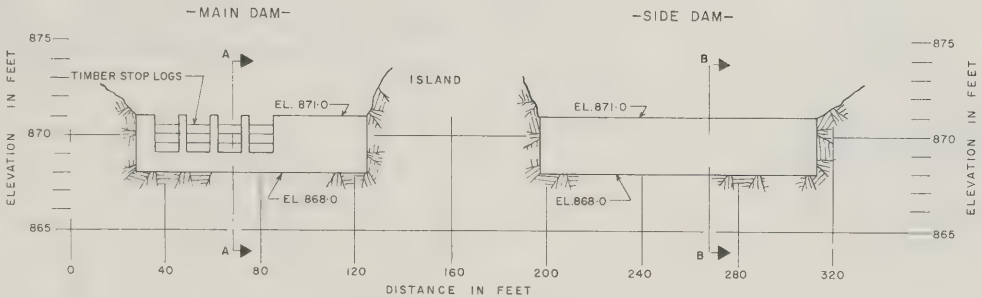
( LOOKING UPSTREAM )

SCALES AS SHOWN




SITE PLAN

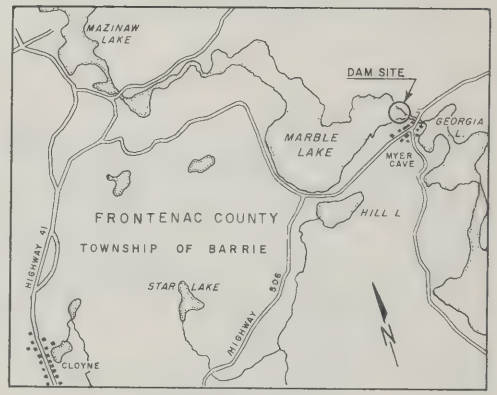
SCALE 0 50 100 200 FEET




ELEVATION OF SPILLWAYS

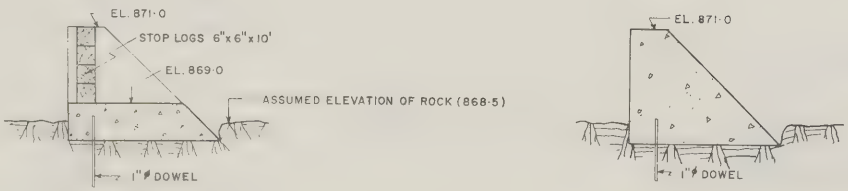
( LOOKING UPSTREAM )

SCALES AS SHOWN




LOCATION PLAN

SCALE 0 ½ 1 2 MILES




SECTIONS

SCALE 0 1 2 3 4 FEET

PROPOSED

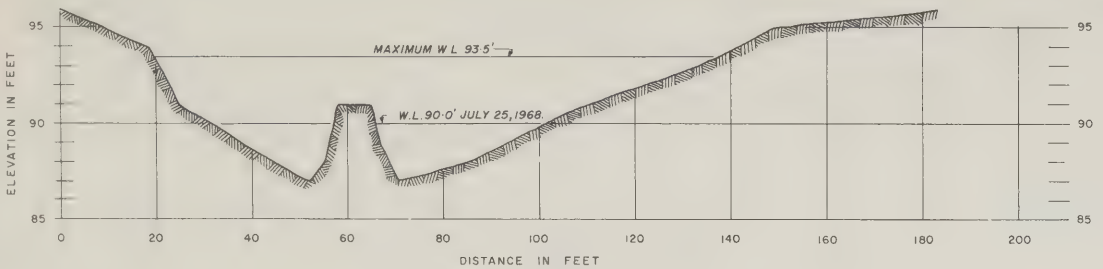
# MARBLE LAKE DAM

SCALES AS SHOWN

ALL ELEVATIONS ARE G.S.C. ORIGIN

FIG. 21-A6

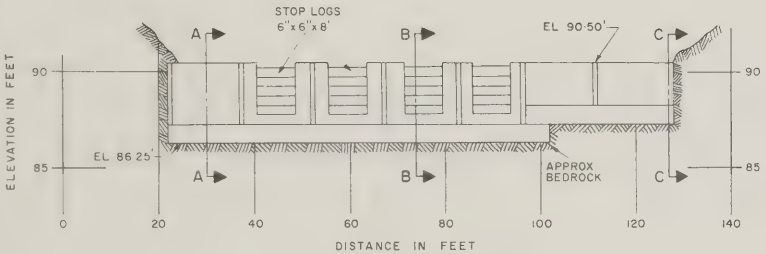
CONSERVATION AUTHORITIES BRANCH – DEPT. E.S.R.M. – W.G.M. 1969




DAMLINE PROFILE

(LOOKING UPSTREAM)

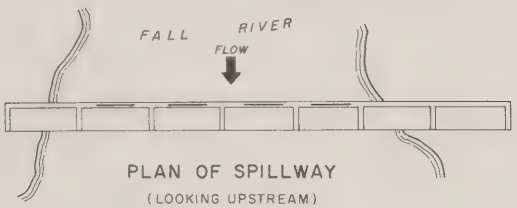
SCALES AS SHOWN




SPILLWAY ELEVATION

(LOOKING UPSTREAM)

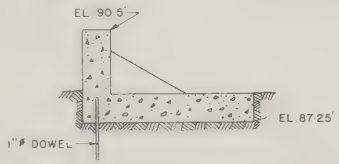
SCALES AS SHOWN




PLAN OF SPILLWAY

(LOOKING UPSTREAM)

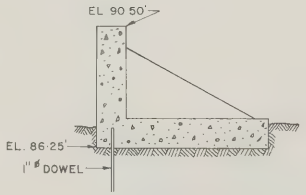
SCALE 0 1 2 3 FEET



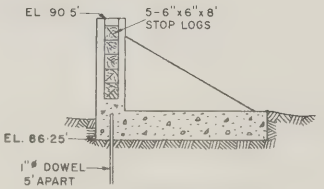

SECTION C-C

NOTE:
THIS SCALE TO BE USED FOR ALL SECTIONS

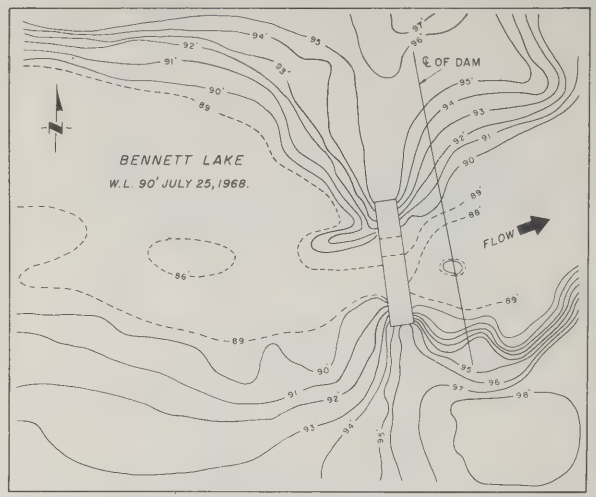
SCALE 0 1 2 3 4 FEET




SECTION A-A

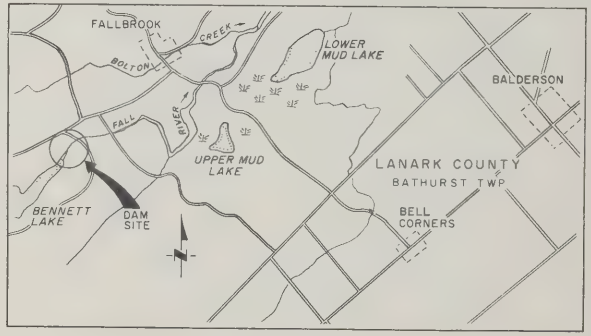



SECTION B-B




SITE PLAN

SCALE 0 25 50 100 FEET




LOCATION PLAN

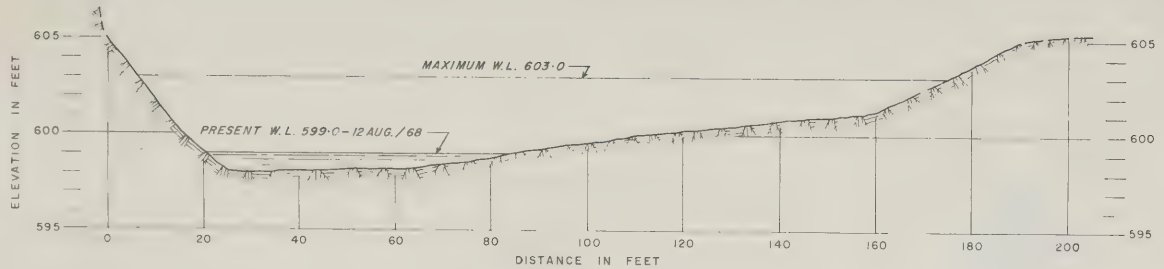
SCALE 0 ½ 1 2 MILES

# THE PROPOSED
# FALL RIVER DAM

ELEVATIONS SHOWN ARE ASSUMED
DIMENSIONS ARE PROVISIONAL

CONSERVATION AUTHORITIES BRANCH DEP'T E B R M T.L.L. 1969

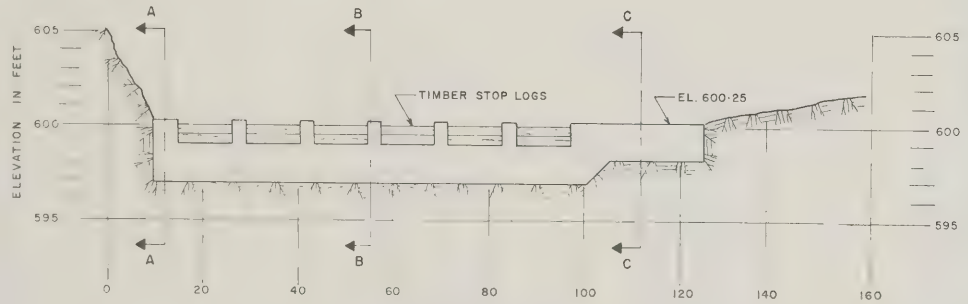
FIG. 21-A-7




DAMLINE PROFILE

( LOOKING UPSTREAM )

SCALES AS SHOWN




ELEVATION OF DAM

( LOOKING UPSTREAM )

SCALES AS SHOWN

NOTES

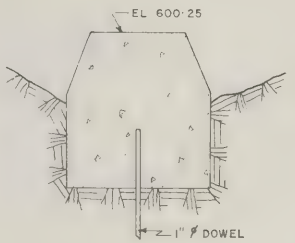
DIMENSIONS SHOWN ARE PROVISIONAL

ELEVATIONS SHOWN ARE G.S.C. DATUM

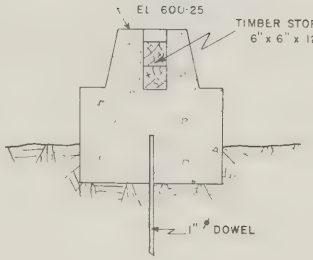
ELEVATIONS SHOWN ARE APPROXIMATE

ALL DETAILS ARE NOT NECESSARILY SHOWN

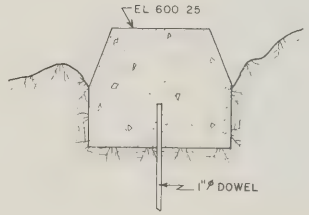
DOWELS TO BE SET 3' APART AND 3' INTO ROCK




-AA-



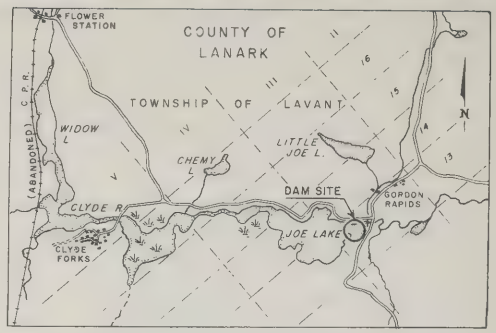

-BB-




-CC-

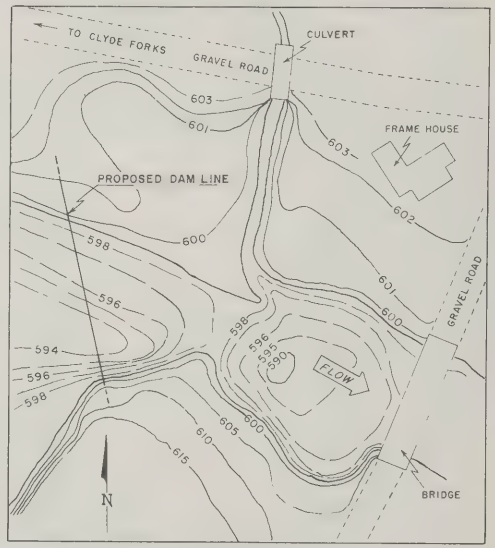
SECTIONS

SCALE 0 1 2 3 4 FEET




LOCATION PLAN

SCALE 0 1/2 1 2 MILES




SITE PLAN

SCALE 0 25 50 100 FEET

PROPOSED

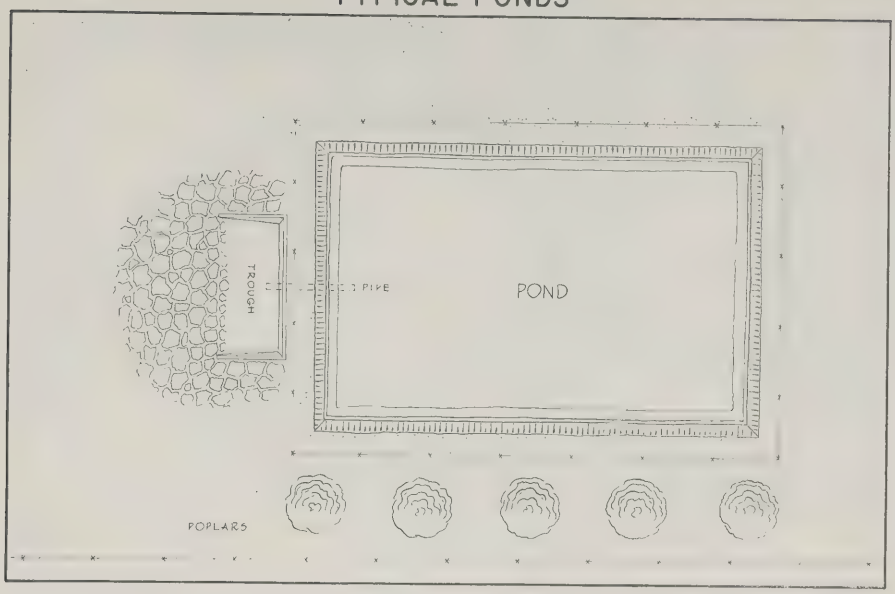
# JOE LAKE CONTROL DAM

SCALES AS SHOWN

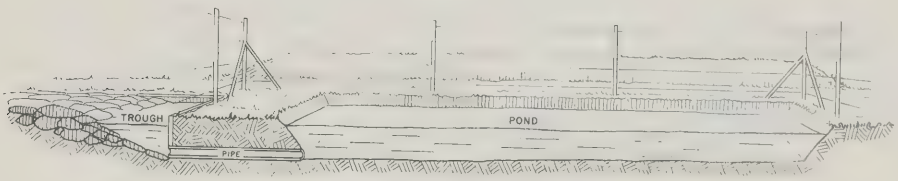
FIG. 21-A8

CONSERVATION AUTHORITIES BRANCH — DEPT. E.&R.M. - W.G.M. 1969

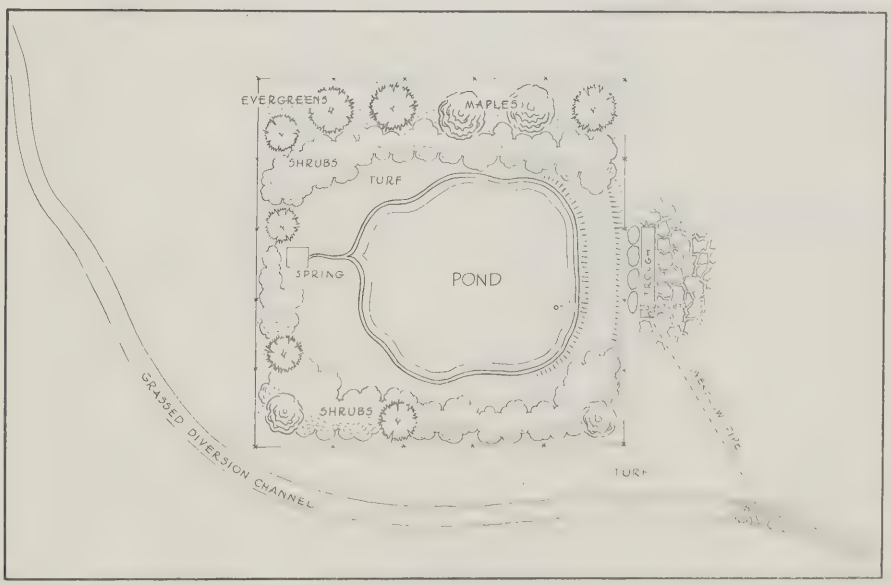
# TYPICAL PONDS



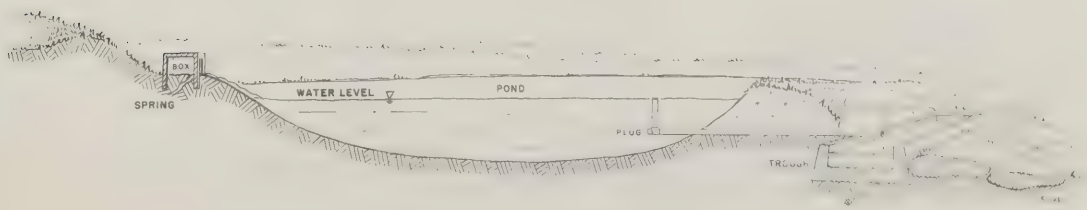

PLAN OF DUG-OUT POND




SECTION OF DUG-OUT POND



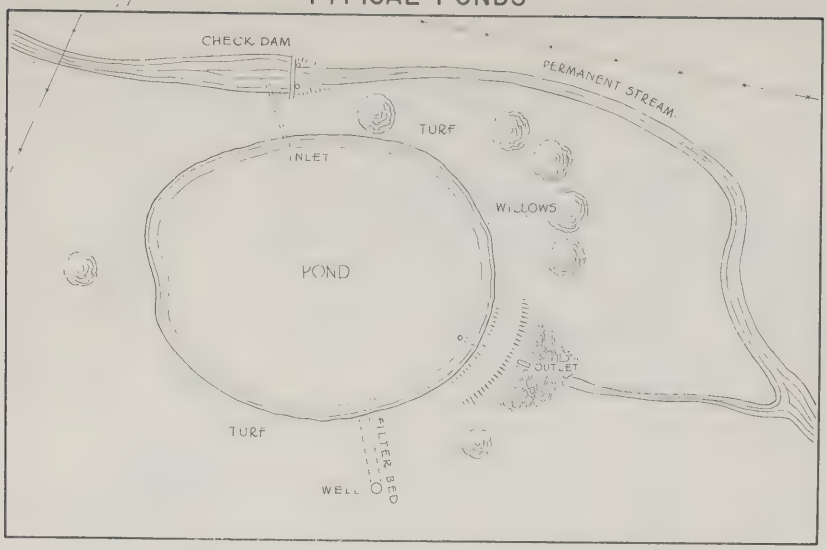

PLAN OF SPRING-FED POND



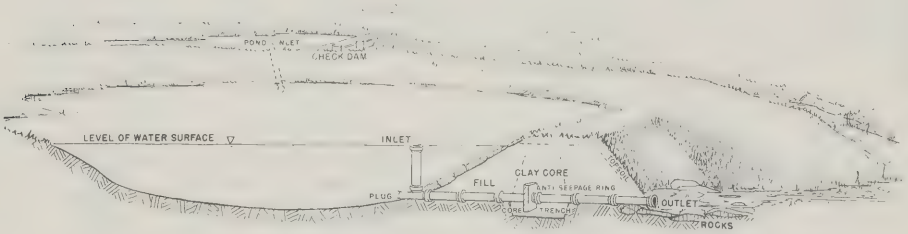

SECTION OF SPRING-FED POND

FIG. 21-A9

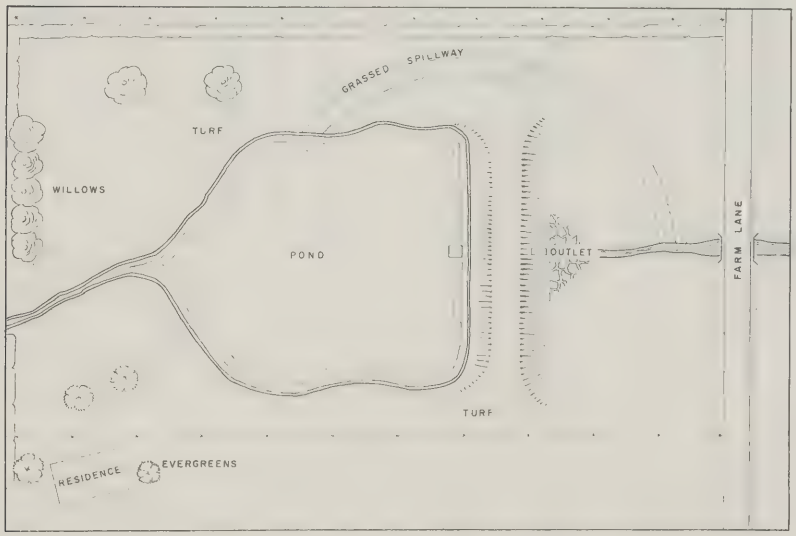
# TYPICAL PONDS



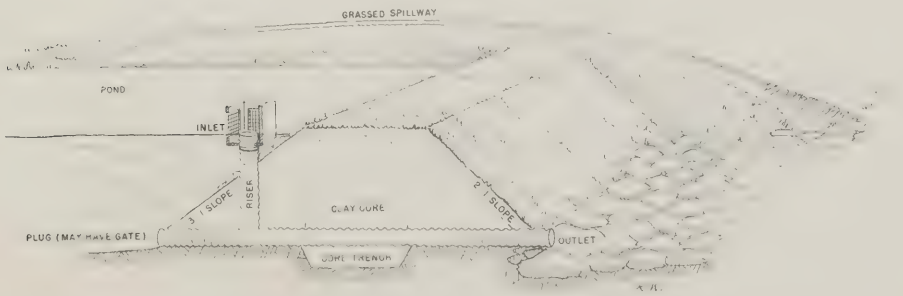

PLAN OF BY-PASS POND




SECTION OF BY-PASS POND

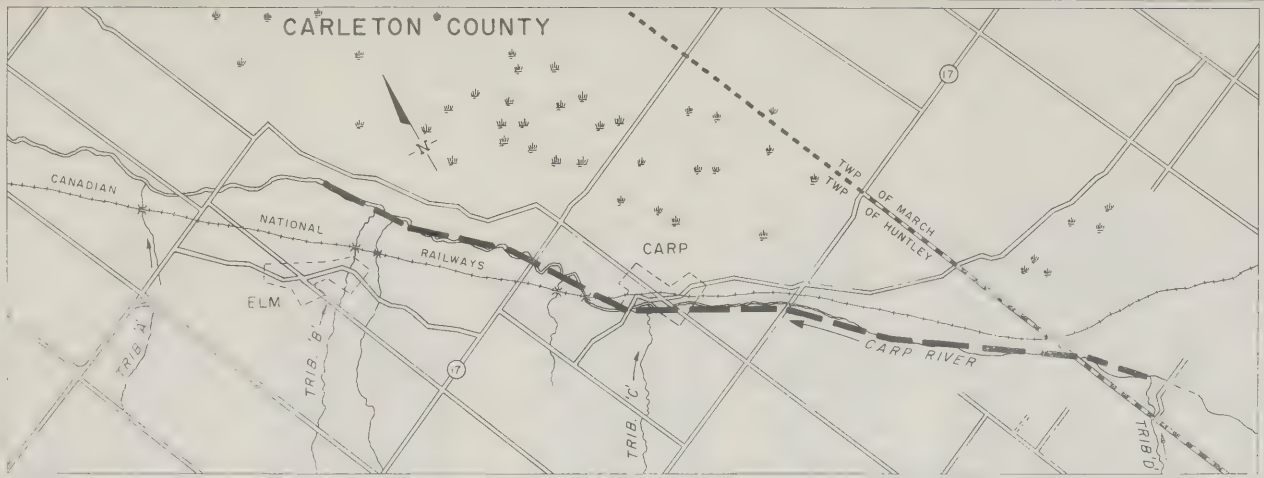



PLAN OF RUN-OFF POND




SECTION OF RUN-OFF POND

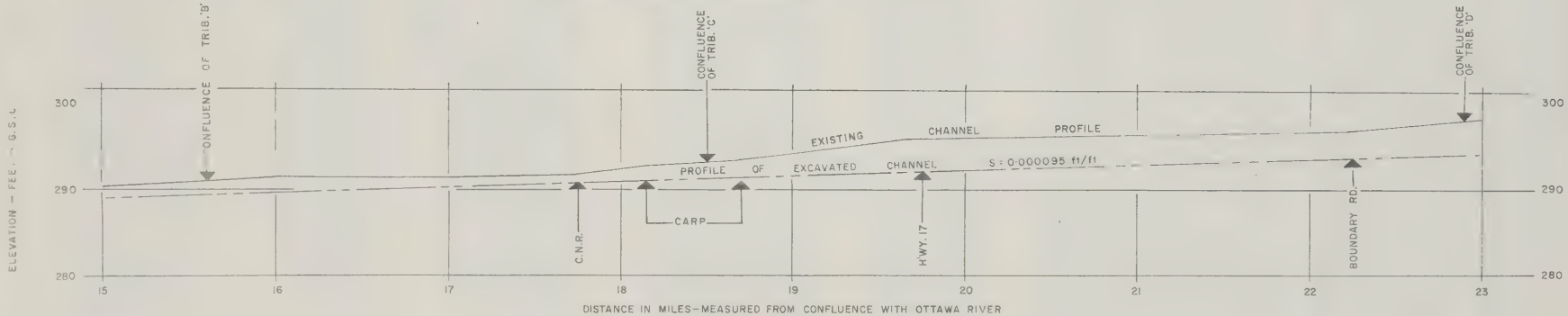
FIG.21-A10



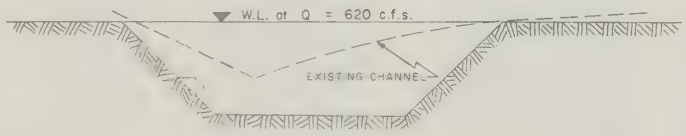

PLAN OF PROPOSED CHANNELIZATION

REGION OF PROPOSED CHANNELIZATION

SCALE ½ 0 1 2 MILES




PROFILE OF CARP RIVER CHANNELIZATION




TYPICAL CROSS-SECTION OF

PROPOSED NEW CHANNEL OF THE CARP RIVER

0 10 20

SCALE—FEET

THE PROPOSED

# CARP RIVER CHANNEL IMPROVEMENTS

ELEVATIONS ARE G.S.C. ORIGIN

SCALES AS SHOWN

CONSERVATION AUTHORITIES BRANCH, DEP'T E. & R.M., P.D.T. 1969

## 6. Land Stabilization and Erosion Control

### a. Contouring, Strip-cropping and Cover Crops

Instances of field cultivation up and down slope grades, barren surface soil left exposed during winter months and the cultivation of row crops on sloping land, all contribute to erosion hazards. Where soils display a high susceptibility to erosion, contour ploughing should be used to offset the problem.

Contour ploughing is the cultivation of a field at right angles to the natural slope of the land, in order to establish a system of ridges across the slope of the field. These ridges will retard the rate of water runoff from the fields, and in so doing increase the amount of water absorbed by the soil. Furthermore, the rate of soil erosion will be decreased. To increase the effectiveness of the contour ploughing on broad, smooth slopes, strip-cropping is also implemented; which is the alternation of strips of cultivated crops with strips of grassland.

Contour cultivation and strip-cropping not only reduce soil displacement on the slopes, but also facilitate working the slopes by reducing the number of turn-abouts of the equipment on the slopes. Also power requirements are less than operating machinery up and down the slopes.

Limitations for contouring arise if the slopes are too steep for safe tractor operation or the terrain is excessively hummocky, as the contouring curves would be excessively sharp. Where small or rectangular fields of traditional cultivation patterns reduce the possibility of implementing contouring, the removal of fences may allow for more extensive areas wherein contour ploughing could be utilized.

For situations where the slopes are far too steep for contouring methods, the maintenance of thick forage crop cover is the most appropriate method of preventing unnecessary soil erosion. A good plant population on the steep, undulating slopes will prevent the soil from becoming exposed to rainfall and water runoff, if these locations are not overgrazed by livestock.

Hence in certain areas within the Authority, where the topography and the soil are susceptible to erosion following cultivation, the farm operator should consider the implementation of contouring and strip-cropping cultivation methods.

### b. Row Crop Cultivation

In row crop production, the extensive tillage programs often make soil more susceptible to sheet erosion. This is especially evident in corn cultivation. Consequently, limited tillage programs have been recommended in recent years by agriculture research authorities.

A limited tillage program essentially consists of a primary fall tillage, without any spring tillage, and a once-over operation with disc-harrows and possibly a finishing harrow. Hence the time spent on row cultivation and seed-bed preparation is greatly reduced, and the soil is not overly worked. Prerequisites to implementing limited tillage are:

i. The soil should be well drained;

ii. Fairly stable soil is necessary, and

iii. The soil should possess a high degree of built-in soil fertility.

More recently, no-tillage programs have been introduced for corn production. This method, however, is still in the experimental stages in Ontario.

In soils where sheet erosion may become a problem due to row crop production, such as Rideau clay soils, farm operators should consider the use of limited tillage programs.

c. Grassed Waterways

Implementation of appropriate methods of handling surface water runoff can curtail the incidence of gulleying in locations where the cultivated fields are susceptible to soil erosion. Water channels in the form of small gullies, if left unchecked, can eventually lead to extensive soil erosion problems within a few years.

One method of controlling surface water runoff can be achieved by the use of grassed waterways. However, the effectiveness of a grassed waterway is dependent upon proper planning, construction and maintenance.

The location of a grassed waterway should follow the natural drainage path of the field system and the terminating point or outlet of a grassed waterway should be such that it does not create another problem. The outlet may be into a municipal drainage ditch, tributary stream, or creek. The grading of the waterway should be shallow with no abrupt break in the cross-sectional grade between the grassed waterway and the surrounding fields. In constructing a waterway, care must be taken that a berm is not created along the outer edge of the grassed waterway. A remnant ridge, of this sort, would not allow the surface runoff from the fields to reach the drainage path of the waterway, and in effect could create an undesirable watercourse along the outer edge of the intended grassed waterway. In addition to the gradual grading of the sides of the grassed waterway the edges should be irregular. A lengthy straight edge running parallel to a waterway could also create an undesirable ancillary watercourse.

The width of a grassed waterway should be 14 to 16 feet wide in order to accommodate farm implements for maintenance work. In

the event that sub-drainage is necessary, the drainage tile should be offset from the centre line of the waterway.

In establishing a grassed waterway the following seeding mixtures are suggested. These mixtures are used for erosion control on embankments, waterways and gullies.

Fertilizer

Work in a mulch of sawdust or wood chips or straw, along with 800 lbs./ac., of 5-20-10 fertilizer before seeding. Apply 300 lbs./ac., of a 10-10-10 fertilizer at time of seeding. Two months after seeding, top-dress with 150 lbs./ac., of a 33-0-0 fertilizer each month until the new seeds are established.

| Well-Drained Soil | | Poorly-Drained Soil | |
|---|---|---|---|
| Seed | lbs./ac. | Seed | lbs./ac. |
| Bromegrass | 15 | Reed Canary-grass | 11 |
| Creeping Red Fescue | 6 | Ky. 31 Fescue | 10 |
| Pennlawn Fescue | 6 | Timothy | 5 |
| Timothy | 5 | Alsike | 6 |
| Perennial Ryegrass (Norlea) | 3 | Perennial Ryegrass (Norlea) | 5 |
| White Dutch Clover | 5 | Ladino | 3 |
| TOTAL | 40 | TOTAL | 40 |

Upon establishment of the sod cover of a grassed waterway, appropriate maintenance measures should be performed annually to maintain a healthy plant population. These measures include clipping of the grass cover several times during the summer period in addition to an application of fertilizer when necessary.

The primary function of grassed waterways is to facilitate the removal of excess surface water runoff from fields, and therefore a waterway should not be used as a roadway during the spring months when working the fields. Ruts created by heavy farm machinery on the moisture-laden soil will alter the shallow cross-sectional grade of the grassed waterway. Furthermore, treading on the waterway in early spring by livestock can also damage the watercourse.

The benefits of grassed waterways, in erosion-prone areas, should be seriously considered by the Authority; with their efforts directed toward those areas where intensified cropping will be carried out. A list of possible locations for the establishment of grassed waterways can be found in Vol. I of the Report.

9. Associated Land Management and Adjustments

a. Reforestation

SHELTERBELTS AND WOODLOT LOCATIONS: Shelterbelts or hedgerows of living plant material can provide wind protection for agricultural crops, especially for high value cash crops. Hedgerows can reduce surface wind speeds which affect micro-climate as well as plant and animal growth conditions. By the proper selection of plant material, spacing and maintenance of hedgerow material, the following benefits may be derived:

DIRECT EFFECTS

i. Wind damage and lodging in small grains and other field crops can be reduced or eliminated;

ii. Snow and the resultant moisture are more evenly distributed over fields, particularly on the higher spots where they are required most; and

iii. Wind erosion of the soil is minimized.

INDIRECT EFFECTS

i. Moisture loss by evaporation is reduced;

ii. Temperatures in the field are raised (This may reduce frost damage, accelerate growth and even lengthen the growing season slightly.); and

iii. Erosion of the soil by water may be reduced by its more even distribution when released from snow.

Selection of plant material for windbreak purposes will depend upon whether the protection is intended for field crop protection or for livestock protection. In the latter case fast growing plant material will be necessary in the initial establishment of the shelterbelt. Later the sturdier and slower growing varieties of trees can be planted to fill in any open spaces.

Upon firm establishment of a shelterbelt some pruning of the trees should be carried out to a height of 4 to 6 feet from the ground. This thinning will allow some air passage through the windbreak and reduce the degree of air stagnation on the immediate leeward side of the shelterbelt.

With shelterbelts of 40 foot width, this can create a sheltering effect on the leeward side to a distance of 25 to 27 times the height of the trees; furthermore, the evaporation benefits have been noted for a distance of 16 times the height of the shelterbelt.

Recent studies of providing windbreaks by means of planting two rows, every 30 feet, of sunflower or sorghum plants in a cultivated crop field have been effective. This method of providing windbreaks also has the additional feature that the shelter plant material can easily be removed by the farmer at a later date.

TABLE A21-1

LANDS RECOMMENDED FOR
PURCHASE FOR FORESTRY PURPOSES

(A) PRECAMBRIAN SHIELD REGION

| Township | Acreage |
|---|---|
| Barrie | 1,900 |
| Bathurst | 7,480 |
| South Canonto | 700 |
| Clarendon | 10,130 |
| Dalhousie | 18,820 |
| Darling | 8,460 |
| Kennebec | 1,050 |
| Lanark | 19,540 |
| Lavant | 2,660 |
| Olden | 5,990 |
| Oso | 10,430 |
| Pakenham | 3,480 |
| Palmerston | 5,500 |
| Ramsay | 12,800 |
| North Sherbrooke | 6,620 |
| South Sherbrooke | 5,350 |

Total: 120,910

(B) EASTERN REGION (East of Mississippi River)

| | |
|---|---|
| Drummond | 3,360 |
| Fitzroy | 13,320 |
| Huntley | 29,610 |
| March | 9,970 |
| Torbolton | 7,350 |

Total: 63,610

In the Authority, areas of lodging in field crops were noted, and on-site inspections were carried out to determine the causes of either minor or major lodging due to wind action. In cases where there was major lodging, the field was devoid of shelter of any kind and often the wind was unchecked or funnelled for some distance. On the rolling hills, the sides directly in the path of the wind suffered the most lodging.

In general the hedgerows are disappearing firstly because the fields are being made larger and secondly because most of the trees are elm and are dying from Dutch elm disease. Woodlots in general are not strategically located to provide wind protection.

b. Pasture Renovation

The utilization of Birdsfoot Trefoil for renovating pastures on rough land has displayed very favourable production results per acre. Trefoil does well on deep soils (although it can be grown in locations having only from four to five inches of soil), tends to be drought-resistant, does not cause bloat and has a tendency to persist for years.

In establishing or renovating pastures with trefoil, a three-stage program must be carefully carried out to acquire a successful stand. The first stage consists of removing existing grass sod by heavy grazing followed by grass herbicides. The next step consists of the application of weed herbicides, fertilizer and the broadcasting of trefoil seed. The final stage is proper management of the site during the seeding year with appropriate weed herbicides and fertilizer applications. A well established trefoil stand will dominate in the second and succeeding years.

As there are numerous areas within the Authority, e.g., portions of Lanark and Dalhousie townships, where roughland pasture could be renovated with Birdsfoot Trefoil, farm operators in these situations should embark upon a pasture renovation program. Local agricultural representatives will provide detailed information on trefoil renovation when consulted.

It should be noted also that the landscape of Dalhousie Township has been chosen as an ideal area for a number of uses, such as for recreation, forestry and wildlife management, since its agricultural capability is generally limited. In the event of Authority land purchases in this township, presumably in larger blocks for these purposes, the purely agricultural use of the purchased areas would cease, unless a limited community pasture feature is included in the management program.

Birdsfoot Trefoil has exhibited a potential wildlife value as cover for cottontail rabbits and Hungarian Partridge. Hence, after purchase, portions of such lands should be selected and laid aside for trefoil establishment, rather than for reforestation. Such measures should rehabilitate certain carefully selected marginal lands equally as well as reforestation, and should add to their recreation and hunting qualities.

10. Fish and Wildlife Developments

a. Fish

There are at least 257 lakes in the Mississippi Valley, besides the great area of the Mississippi River itself. A large number of these lakes are either now under active management by methods such as an annual or biennial stocking or will be managed as soon as they have been surveyed.

The two most important lakes, from the point of view of fishing pressure, are Mazinaw Lake (4,350 acres), and Mississippi Lake (5,800 acres).

MAZINAW LAKE: This lake has, according to recent reports from the Department of Lands and Forests, given consistently good fishing for many species, particularly lake trout. The Department of Lands and Forests is, however, keeping a close watch on the situation, and if the lake trout population becomes depleted, the lake will be restocked with this species. In this sense it may be said to be under management now.

LAKE TEMPERATURES: It is recommended that in the lakes listed below, for which depth soundings are now available, depth temperature relations should be determined in midsummer so that the possibilities for introducing lake trout, brook trout or bass can be investigated. In the case of brook trout introductions (unless the lakes are to be used for "put-and-take" fishing), the lakes must be spring-fed with gravel beds, with water moving through the gravel for spawning purposes. This may, of course, be found in a cool tributary of any lake.

| Township | Lake | Maximum Depth |
|---|---|---|
| Lavant | La France | 52' |
| Lanark | Horn | 41' |
| Lanark | Baxter | 29' |
| Denbigh | Rolufs | 34' |
| Effingham | Stoll | 32' |
| Abinger | Irvine | 36' |
| Abinger | Finch | 29' |
| Abinger | Mallory | 31' |
| Miller | Shaw | 45' |
| Miller | Armstrong | 85' |
| Miller | Big | 100' |
| Clarendon | Ardoch | 49' |
| Clarendon | Turtle | 30' |

... Listing Continued

| Township | Lake | Maximum Depth |
|---|---|---|
| Clarendon | Coxvale | 56' |
| Olden | Bass | 38' |
| Olden | O'Reilly | 52' |
| Blithfield | Bartraw | 40' |

BENNETT LAKE (Bathurst Township): This lake, considering its relatively small size (1,268 acres), is a very important lake for recreation as there are more than 100 cottages on it. The lake will be affected by the proposed weir near Fallbrook. The weir will have the effect of raising the late summer water level by about four or five feet. The lake has been low in recent years except in 1969 when precipitation was much above normal. The effect of the weir on fish life should be beneficial. The weir is therefore recommended from the biological point of view, quite apart from other benefits which will accrue.

It is recommended that the Authority urge the continuance of the stocking (either annually or every two years), of Bennett Lake with 1,000,000 eyed eggs of walleye (pickerel).

BUCKSHOT CREEK (Clarendon Township): There appeared to be few or no bass in Buckshot Creek. This is one area where the introduction of bass or bass spawning boxes might be useful. The boxes should be filled with gravel.

BARBERS LAKE (Dalhousie Township): This lake should be considered for possible stocking with brook trout.

TAYLOR LAKE (Lanark Township): It is recommended that some of the stumps should be removed from Taylor Lake to allow safer access to the better fishing areas. It is also recommended that the channel between Taylor Lake and Clayton Lake (Lanark Township) be widened so that boats may easily pass in the narrows.

ROBERTS LAKE (Darling Township): This lake is more than 50 feet deep and it should be considered as a possibility for stocking with brook trout or lake trout.

SAMUEL LAKE (Lanark Township): Some consideration should be given to stocking this lake with largemouth bass.

POLLUTION AFFECTING FISH LIFE: It has already been mentioned that the oxygen content of the Mississippi River at Galetta has been measured as low as four parts per million and that this occurred during the afternoon, and this would be lower at night. Furthermore, four parts per million is the absolute minimum recommended for game fish to survive. The flow of the Mississippi River was higher than normal during the course of the survey in 1968, and the river did not show the worst possible conditions. Game fish distribution must be radically affected at Carleton Place and Almonte.

ANGLING QUESTIONNAIRE: Information obtained from completed angling questionnaires is very valuable. It gives an indication of the degree of utilization of individual waters; it indicates the rate of success of fish plantings; and it provides information about the natural reproductive potential of the waters.

These data serve to direct fish plantings to those waters where the highest angling return for money expended, consistent with public interest in the particular water, can be realized.

It is the policy of the Department of Lands and Forests to mark all hatchery fish by fin clipping before planting. By this means hatchery stock can readily be separated from wild, natural regeneration. Information regarding the percentage of hatchery fish in any given catch is therefore of vital importance to fisheries management.

It is therefore recommended that wide publicity be given to the filling out by anglers of the angling questionnaires, and to their return to the Department of Lands and Forests District Office concerned.

A large number of anglers persist in reporting trout catches only. Management of a fishery in any water requires the management of all species present. The recording of total catches, including warm water species and panfish, is therefore desirable.

b. Deer Browse

In thinning areas of soft maple, the cut-and-bend method of thinning is the principal method recommended to produce maximum browse. The sprout growth of soft maple which results from this method is usually available to deer for about ten years. This method is described by Shafer*.

Apart from the above method, instructions for the management of deer yards by W. F. Cheshire were published by the Department of Lands and Forests in 1967+, and where possible these should be followed. The staff of the Kemptville Forest District have similar plans.

It is recommended that the practice of deer range improvement be greatly expanded in the Mississippi Valley, both in the Tweed and Kemptville districts.

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* Shafer, E. L. United States Forest Service Research Paper N.E. 33, 1965, Northeastern Forest Experiment Station, Upper Darby, Pennsylvania.

+ Abridged General Management Instructions for the Deer Yards in the Tweed District, Part 2, Department of Lands and Forests, July, 1967.

c. Wildfowl

WOOD DUCK NESTING BOXES: Trees suitable for Wood Duck nest holes are becoming more and more scarce in the Mississippi Valley. Virtually no tree is proof against depredations by raccoons, and for a satisfactory hole a tree should have a minimum diameter of from 14 to 15 inches. Logging is gradually reducing the number of available trees. It has long been obvious in the United States, and more recently in Ontario, that some type of artificial nest box should be designed, made and installed, if the number of Wood Ducks is to be maintained and, if possible, increased.

Much research has been underway to this end at the United States Fish and Wildlife research centre at Laurel, Maryland. It has long been evident that the average Wood Duck nesting box designed with little thought is either not used or serves as an incubator for starlings.

Most of those that have been installed in Ontario up to date have been unsuccessful. If it is decided to use one of the old types, the entrance hole should be oval, three and one-half inches high with a maximum width of four and one-half inches. There are a fair number of dead elms standing in the water of beaver ponds. On these a bracket can be installed curving outward from the tree, with the box near the top of it and the nest hole must invariably be placed as far away as possible from the tree. The bracket is made of strap iron, one-quarter inch thick and one to one and one-quarter inches wide. The bracket should be coated with rust-preventing paint, and the box should not be closer than 24 inches to the tree. If a wooden nesting box is to be made, a circular shirt-tail of galvanized stove pipe 12 inches in diameter, as used on tobacco farms, should be nailed to the bottom of the box and surround the post or pole to which the box is nailed.

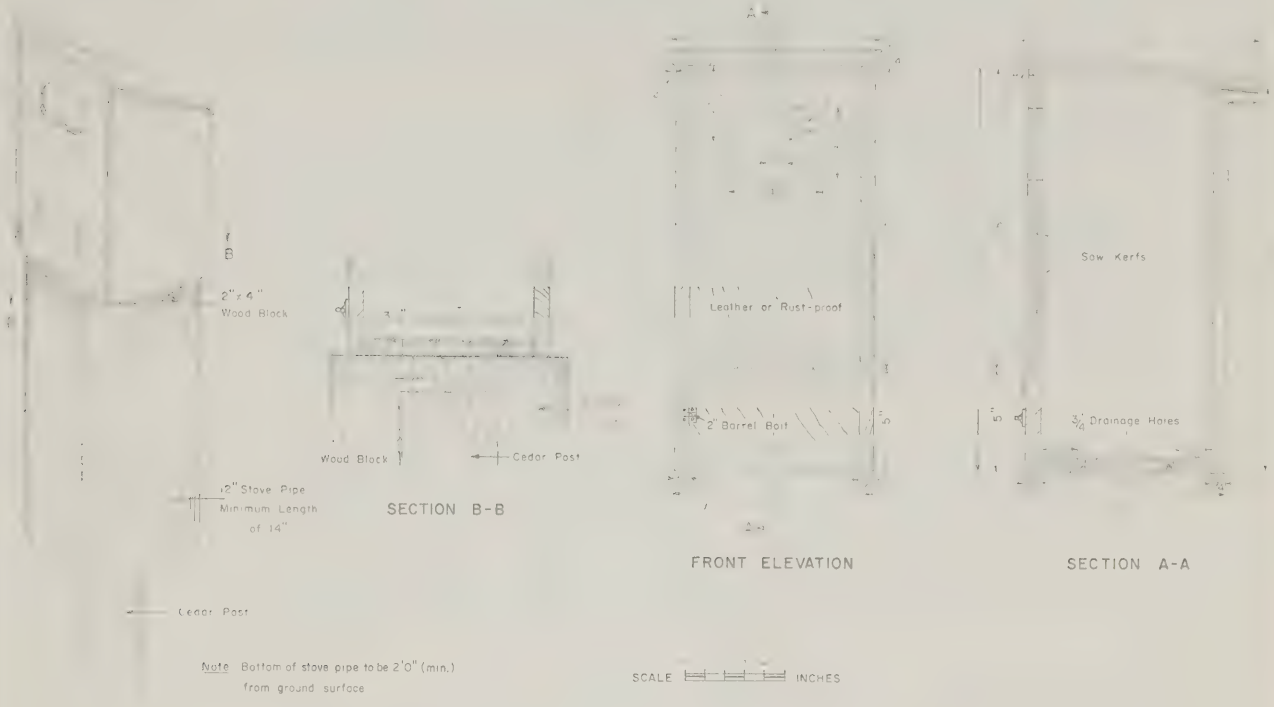
Tests are now underway to design structures which will deter starlings. Control of light is achieved by constructing openings at both ends of the nest structure. Most Wood Ducks are more tolerant of light in their nests than are starlings. One of the most successful horizontal nesting boxes is illustrated in the accompanying drawing.

The nest box is basically a cylinder (two feet by one foot), of which the ends are partly blocked as described below. The cylinder is supported from three to five feet above the water's surface by a steel, aluminum or wooden pole to which is attached an aluminum raccoon guard.

The construction is as follows:

i. A 42- by 24-inch strip of one-inch mesh galvanized fur-farm wire is rolled into a cylinder, one foot in diameter; the wire is overlapped and should be cut so that the wire ends can be "clinched" over.

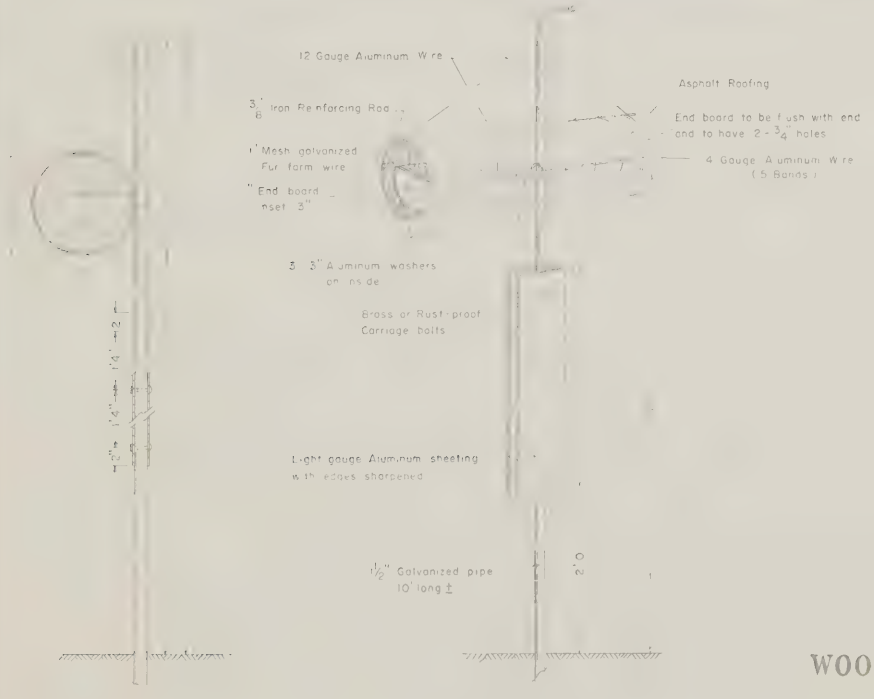
ii. A sheet of green asphalt roofing of similar size is rolled around the fur-farm wire and held in place by five bands of 14 gauge aluminum wire.




SCHEMATIC VIEW

NOT TO SCALE

Suggested material for box — Pine or Cedar.




PROPOSED
ALTERNATIVE DESIGNS
FOR

# WOOD DUCK NESTING BOXES

SCALES AS SHOWN

FIG. 21-A12

CONSERVATION AUTHORITIES BRANCH, DEPT. E.&R.M., L.R.L./69

iii. Two end boards, one-inch thick (one with a diameter of 12 inches and the other similarly circular but with a top section three and one-half inches deep removed), are nailed in place.

iv. The box is fastened to a stake with 12-gauge aluminum wire attached to the ends of three-eighths-inch iron reinforcing rod. The box is further supported by a loop of wire passing through the "mid section" of the box and around the stake. This wire is prevented from pulling through the wire and asphalt roofing by an aluminum "washer" (dimensions three by three inches), inside the box. A further piece of wire is run between both the above points of attachment, for additional strength.

v. The raccoon guard (two sheets of aluminum three feet by four inches, thick enough to be given very sharp edges), would be placed on either side of the pole and held in place by five rust-proof rivets or self-threading screws. U. S. research workers stress that raccoons can climb almost anything (even smooth iron pipe), and point out that screws should be buffed smooth to prevent "toe holds" !

vi. A ladder of hardware cloth should be attached to the inside of the front end, before assembly. This will permit the ducklings to climb out.

vii. Two one-inch-diameter holes are bored about one-third down from the top of the back end board. Two drain holes should be drilled in the bottom of the nest box.

Boxes can be placed surprisingly close to one another, almost back to back.

Use of nest boxes may be increased if an alighting platform is provided. This can be a board with an overhang of about six inches attached to the bottom of the box.

Since Wood Ducks carry no nest material, about five inches of sawdust and shavings should be put in the nest structure. Used by the ducks to cover their eggs, this substitutes for the decaying wood usually found in natural tree cavities. William R. Miller reports that in Vermont starlings often remove shavings from a structure, but are not so prone to remove sawdust. Shavings should be included, however, because sawdust tends to pack.

Structures fail to fulfill their purpose if they are not maintained properly. They should be inspected at least once a year, preferably shortly before the birds return to nest. At this time repairs can be made, debris cleaned out, sawdust and shavings loosened, and fresh material added.

It costs little more to build a good nest structure that will last 10 to 15 years than it does to build one that will last only 3 to 5 years.

Durable, predator-proof structures in carefully selected sites produce more ducklings and are well worth the little extra work and expense. It is a great deal easier to install a nesting box which is on a pole, if the work is carried out in winter and a hole is made through the ice.

Because water levels and aquatic vegetation change from year to year, it cannot be guaranteed that a lake which is suitable for Wood Ducks will be suitable the next year. However, the following is a list of lakes in the Mississippi Valley which had areas suitable for Wood Ducks in 1968. They should be examined again and a selection of the best ones used.

| Township | Water Body |
|---|---|
| Effingham | Feeny Lake |
| | Stoll Lake |
| Abinger | Irvine Lake |
| | Mallory Lake |
| | Brooks Lake |
| Miller | Big Lake |
| | Grindstone Lake |
| Barrie | Shabomeka Lake |
| | Marble Lake |
| | Shoepack Lake |
| Olden | Bass Lake |
| | Little Canoe Lake |
| | O'Reilly Lake |
| Palmerston | Sunday Lake |
| Lavant | Joe Lake |
| | * La France Lake |
| South Sherbrooke | Fagan Lake |
| Dalhousie | * Big Mud Lake |
| | * Barr Lake |
| Bathurst | Bennett Lake |
| | * Upper Mud Lake |
| | * Lower Mud Lake |
| Lanark | Riven Lake |
| | * Horn Lake |
| | Baxter Lake |
| | Samuel Lake |
| | Quigg Lake |

* Area is exceptionally good

| Township | Water Body |
|---|---|
| Pakenham | Impoundment of the Indian River near the Hydro-electric power line |
| | Beaver ponds in the area north of Bellamy Road |
| South Sherbrooke | * Part of the Fall River near Provincial Highway 7 |
| Huntley | * Manion Corners Marsh in Concession IX, Lots 9 to 11 |

Wherever Wood Duck nesting boxes are installed, Duckweed (Lemna or Spirodela) should be introduced if it is not already present. It can be found on a great many lakes and ponds in the valley and is easily transported. These species reproduce rapidly and, with the invertebrates which are found on or under them, make excellent food for young ducks.

LOWER FALL RIVER HUNTING AREA: The land and water in Concession X, Lots 23 to 27 inclusive, in Bathurst Township, are recommended as a possible managed hunting area. This would include Lower Mud Lake and the lowest part of the Fall River. The area could be enlarged westward to include Upper Mud Lake in Concession IX and X, Lots 21 and 22 of Bathurst Township. The area could also be increased northward, including Lots 23 to 27, Concession XI of Bathurst Township. This would include a part of the Mississippi River. Hunting pressure is now high since 23 duck blinds were seen in the lower section of the Fall River. If the hunting on the area is to be managed, some part of the water area should be maintained as a refuge. A detailed map of this area is available to the Authority.

## 11. Recreational Development

### a. Conservation Areas — Acquisition and Recreational Classification

It has been the goal of many Authorities to provide an integrated, controlled recreation system.

If the Authority cannot develop a full range of recreation facilities, it is even more important that those facilities it does provide be planned in conjunction with other agencies so they are mutually complementary. They should contribute the utmost in quality and benefits to the environment, and to the other recreation facilities available within the Authority's jurisdiction.

Due to the decrease in the amount of land suitable for outdoor recreation caused by the escalation of land values, the development of private facilities such as homes and cottages, as well as the growing leisure time expenditure, it is improbable that the Authority will ever have excessive land for recreation development. Pressure from lack of land is already being felt in the Mississippi Authority.

In addition to the limited amount of land the Authority could afford to purchase outright, there are a number of alternatives which should be investigated and utilized where possible. Some of these alternatives are:

i. the use of easements for limited control, and various types of trails and buffer zones around conservation areas;

ii. cluster zoning for cottage development;

iii. open space zoning in conjunction with agricultural and residential development zoning;

iv. obtaining commitments for sale from owners, to be exercised at such times as the land is disposed of;

v. solicitation of gifts of land, making use of the "foundation principle," and

vi. lease-back arrangements with former owners.

Once a piece of land is acquired, there is pressure to develop it immediately. However, premature development without proper planning may lead to over-use or misuse. Specialized uses such as swimming beaches, scenic lookouts and rare biotic communities cannot be regenerated or relocated if they deteriorate through imposed misuse of a basically non-renewable resource. Some intensive recreational uses such as picnic grounds, camp ground, and other heavily used day-use areas may be possible on alternative sites.

Since the more attractive and/or unusual sites are likely to be the first to come under conservation control, serious thought should be given early to each and every planned development to ensure that important long-range goals are not sacrificed for short-range utility.

As a step toward regional planning, and to assist the Authority considering recreational development in its broadest perspective, a classification of conservation recreational lands should be established. The following is a "use zone" categorization which can apply to either a conservation area in total or to sub-zones within an area.

The main classes are as follows:

CLASS I: NATURAL AREAS — These areas would have minimum development and could include: (a) wilderness zones, (b) valley flood lands, (c) biotic or geomorphic preserves, (d) natural streams. The permitted uses in natural areas would be: (1) hiking trails, (2) scenic lookouts, (3) canoe routes, (4) white water canoeing areas, (5) bridle paths, (6) bivouac-type campsites, (7) nature study, and (8) cross-country skiing.

Depending upon the size of the area and whether it was an entire conservation area or a sub-zone within a larger conservation area, there would be a somewhat different approach to such things as interpretive techniques.

A natural area could assume a corridor pattern, especially where it contained a hiking or canoe route, and could also contain some land under only partial or easement control by the Authority.

CLASS II: MULTIPLE-USE AREAS — This category would conform more closely to the concept of the conservation area accepted to date. A multiple-use area could very well include several sub-use zones and hence could permit in sub-zones all of the uses permitted in any of the areas. These areas would normally occur where a reservoir had been constructed, but could also be developed on a large natural area under the ownership of the Authority.

CLASS III: INTENSIVE SPECIFIC USE AREAS — This would include those activities which place considerable stress upon the natural landscape. These areas would have to be owned by the Authority. They could be totally conservation areas, but would be more frequently sub-zoned within a larger multiple-use area. The specific uses would include: (a) picnicking, (b) camping — family and group, (c) swimming, (d) boating, (e) fishing, (f) heavily-used natural trail or interpretive locations, (g) playgrounds, (h) firearms ranges, (i) archery ranges, (j) dog trial ranges, (k) scenic lookouts, (l) launching sites or water access points, (m) rock-collecting areas, (n) skiing areas, (o) tobogganing areas, (p) skating ponds, (q) sleigh ride trails, (r) skidoo areas or trails, (s) motor bike areas or trails, and (t) scuba diving areas.

CLASS IV: EXTENSIVE SPECIFIC-USE AREAS — These areas would often be for single purpose conservation areas, but some types might be incorporated into sub-use zones in larger multiple-use areas. Hunting might require exclusive use at some seasons.

Use could include (a) archery, (b) rock climbing, (c) motorized tobogganing, (d) cross-country hiking, (e) trail riding or skiing, and (f) hunting.

The development of permanent facilities in this class of area would be permitted, in contrast with natural areas (Class I). In some cases this might be the primary difference between the two classes.

It is conceivable that to maintain control over the numbers of people in Class IV and Class I areas, entrance would be by permit only.

CLASS V: HISTORIC SITE AREAS — These could consist of sub-zones in a larger area. However, experience has indicated that historic sites often form the focus for the conservation area in which they are located, particularly if a structure is involved. Possible attributes for this class of area include: (a) block houses and defensible houses, (b) sawmills, (c) grist mills, (d) cheese factories, (e) pioneer farms or buildings, (f) blacksmith shops, (g) churches, (h) historic homes, (i) sites of significant events, and (j) historic roads or waterways.

CLASS VI: SERVICE AREAS — This last zone class would be necessary only in intensively used multiple-use areas as an adjunct to Class III areas. It will include service concessions such as refreshment booths, information, supplies, watering facilities,

change-houses and first aid posts. Specific concessions such as marinas or rental and ski lodges would be found here. A visitor centre, museum, nature school or a significant interpretive facility might be looked upon as a service and the area around it zoned as such.

Although the dividing lines between classes of use-zones are somewhat blurred, such a scheme gives the Authority a management tool and lays down guidelines for the public that will enhance their experience as well as their appreciation of the aims of conservation. As use in all areas intensifies, the Authority must be alert to the development of conflicting interests which may require additional regulatory controls.

When considering a recreation facility system or a part thereof, it is necessary to consider a number of factors: (1) What is the goal of the system or site in terms of the philosophical base of the responsible agency [the Authority]? (2) What is the desired capacity of the site or the system to provide for the activities of many interest groups in socio-economic levels? (3) Is provision being made for latent demand for new types of activities or demands? (4) What methods will be used to acquire and/or control the land? (5) To what degree will conservation areas be multi-purpose areas? (6) Is the system flexible? A few brief answers to these questions are in order.

It is important that the Authority recognize the total environment or eco-system of the site, and through multiple resource management attempt to make the optimum use of its land. Recreation can be a primary, as well as an ancillary, use in resource management.

By providing recreation space, conservation areas contribute to the needs of the human resource in the eco-system. If the benefits derived from this base are to have any influence upon the users, so that the public becomes more aware of the impending land crises, and has sufficient knowledge to take a stand on resource management questions, it is desirable that every exposure in a conservation area must become a quality, educational experience.

That segment of the population seeking outdoor recreational experiences represents a diversity of interests. Care must be taken not to impose a "middle class ethic" upon all planning so that mediocrity will not prevail throughout the system.

Because an area is heavily used it is often claimed that it is "what the people want." However, the question "Do they have any alternative?" must be raised. There is, of course, a need for the bathing beach, the campground and the picnic area. On the other hand some individuals are repelled by these intensively-used areas, and seek something more solitary, such as hiking, riding, cross-country skiing, or canoe tripping.

Above all, the system must be flexible. The classification of park lands mentioned above will allow for flexibility and should not be allowed to become a rigid set of rules which are fine in theory but impractical in application.

TABLE A21-2

LOCATION OF PROPOSED CONSERVATION AREAS

| | | |
|---|---|---|
| Site I | Galetta Pond | Concession VI, Lot 20, Fitzroy Township |
| Site II | Carp | Concession II, East part Lot 19, Huntley Township |
| Site III | Carp Falls | Concession I, East part Lot 7, Huntley Township |
| Site IV | Pakenham | Concession XI, Lot 11, Pakenham Township |
| Site V | The Burnt Land | Concession XII, Lots 11-17, Ramsay Township |
| | | Concession XII, Lots 7-12, Huntley Township |
| | | Concession XI, Lots 11-15, Huntley Township |
| Site VI | Appleton | Concession X, part Lots 3, 4, Ramsay Township |
| Site VII | Brightside | Concession III, part Lots 25, 26, Lanark Township |
| Site VIII | Herron Mills | Concession XI, Lot 9, Lanark Township |
| Site IX | Fallbrook | Concession III, Lot 9, Lanark Township |
| Site X | Feldspar Quarry | Concession VIII, Lot 15, Bathurst Township |
| Site XI | Bartlett Bay on Bennett Lake | Concession XI, Lots 9, 10, Bathurst Township |
| Site XII | Fagan Lake | Concession IX, Lot 20, South Sherbrooke Township |
| Site XIII | Drowned Land | Concession III, Lots 14, 15, North Sherbrooke Township |
| Site XIV | Sugar Shack | Concession XI, Lot 10, Palmerston Township |
| Site XV | Gunn Creek Rapids | Concessions III, IV, part Lots 21, 22, Dalhousie Township |
| Site XVI | Peterson Creek Bridge | Concession VII, Lot 16, Lavant Township |
| Site XVII | Lake Palmerston Lake Canonto | Concession I, Lot 22, part Lots 18, 19, South Canonto Township |
| Site XVIII | Green Lake | Concessions I, II, Lots 31-33, Clarendon Township |
| Site XIX | Marble Quarry | Concession IV, Lot 38, Clarendon Township |

... Table Continued

TABLE A21-2, Continued

| | | |
|---|---|---|
| Site XX | Kashwakamak Island | Concession VII, Lots 5-7, Barrie Township |
| Site XXI | Mallory Creek | East Range, Lots 16-20, Abinger Township |
| | | Concessions VII, VIII, Lots 23-26, Abinger Township |
| Site XXII | Pake Lake | West Range, Lots 1-3, Denbigh Township |
| Site XXIII | Eagle Hills | Concessions IV-VII, Lots 30-32, Denbigh Township |
| Site XXIV | The "Klondike" | Concession III, Lots 4-6, Pakenham Township |
| Site XXV | Sharbot Lake-Calabogie Railroad | |